Final Well Report

Well: 35/9-4 SX

Licence 153

HYDRO

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NORSK HYDRO

FINAL WELL REPORT

WELL 35/9-4 SX

FEBRUARY 1999

LIST OF CONTENTS, WELL 35/9-4 SX

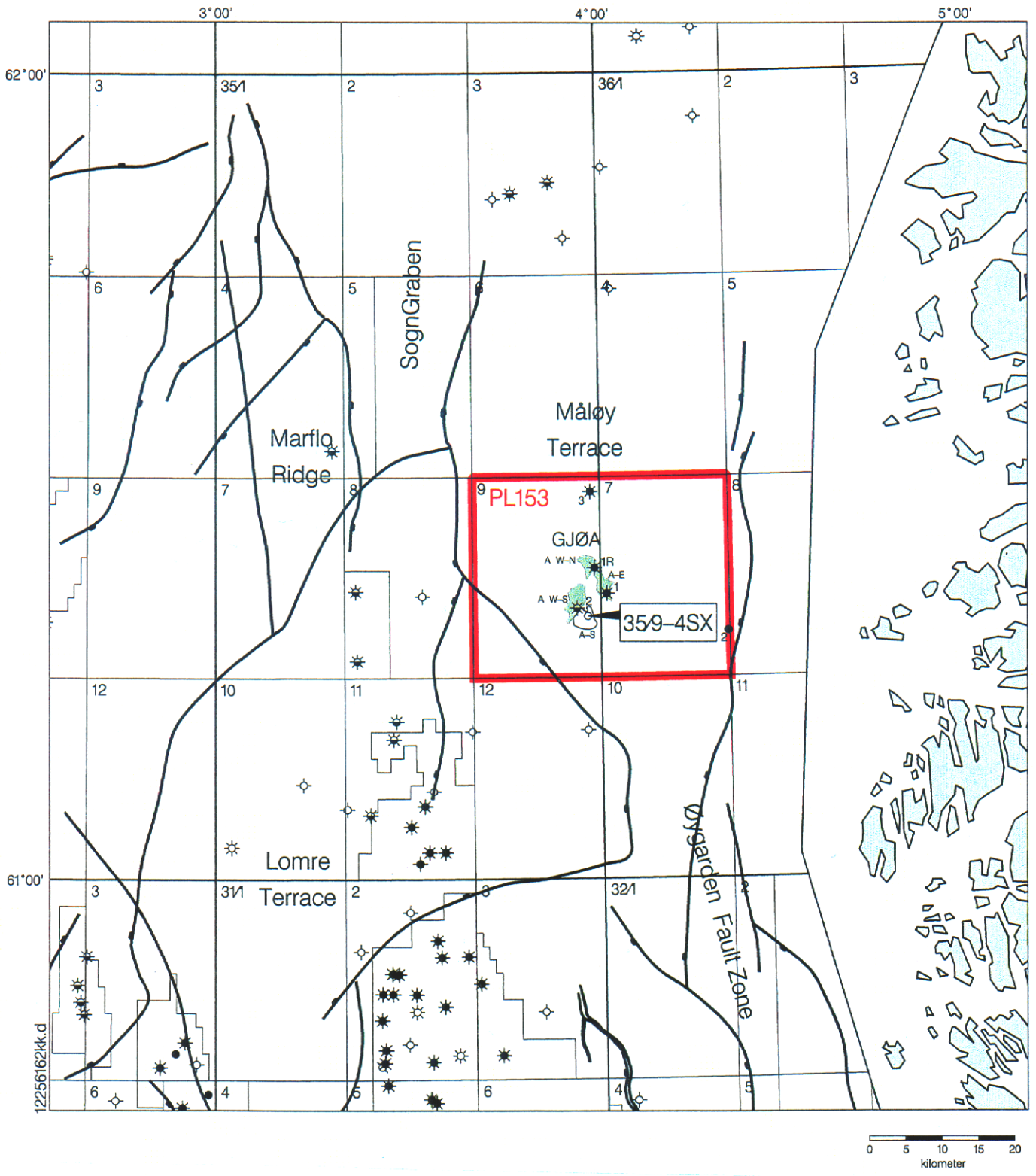
PREFACE

License PL153 was awarded to Norsk Hydro ASA in 1988.

The well 35/9-4 SX was drilled by Norsk Hydro ASA, on behalf of Statoil, Norske Shell, Saga and Deminex as partners of the licence.

All depths in this report are mMD RKB unless otherwise stated.

PAGE FOR LOCATION MAP



Location Map of Well 35/9-4 SX

SUMMARY OF WELL DATA	
LOCATION:	61°19' 32.50"N 03°57' 55.23"E 6 799 609.4 mN 551 677.2 mE ED50, UTM Zone 31, CM 03°E
OPERATOR: RIG: CONTRACTOR:	Norsk Hydro Transocean Leader Transocean
KB ELEVATION (to MSL): WATER DEPTH (MSL):	23.5 m 364 m
START OF OPERATIONS: WELL SPUDDED: REACHED TD ON: COMPLETED: STATUS: FORMATION AT PTD:	08.07.98 12.07.98 Not reached 12.08.98 Killed and abandoned Sele Fm/Rogaland Gp
PTD DRILLER (mRKB): TD LOGGER (mRKB):	1261m
DRILLING DEPTHS:	36" to 451m 17 1/2" to 1261m
CASING DEPTHS:	30" to 449m 13 3/8" to 1255.5m

SECTION A

GEOLOGY

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SECTION A: LIST OF FIGURES, TABLES AND APPENDICES

FIGURES

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APPENDIX

1 OPERATION SUMMARY

Operations on well 35/9-4 SX commenced the 12th of July-98 with the semi-submersible drilling unit "Transocean Leader".
A 36" hole was drilled to 451 m, and the 30" conductor set at 449 m.
The 17 1/2" hole section was drilled riserless to 1261 m. During running of the 13 3/8" casing, water flow was observed in the wellhead area. The casing was set at 1255.5 m, and the riser and BOP were installed.
The water flow increased in magnitude and amount, and a successful killing operation was initiated.
The well was permanently plugged and abandoned the 12th of August-98.

This report summarise observations experienced during the course of well 35/9-4 SX, including pore pressure and formation temperature calculations, post site survey report and a panel on the top hole stratigraphy enclosed as section C; "Completion Log".
Drilling summary and experiences are enclosed in section B; "Operations".

2 OBJECTIVES

The well 35/9-4 SX is the sixth exploration well in the license and should test the hydrocarbon potential of the A South structure. The primary target was sands of the Sognefjord and Fensfjord Fms., which are expected to be in full internal communication and with common fluid contacts.

The major objectives of well 35/9-4 SX were to:

* Prove oil and gas resources within the A South structure in order to increase the commercial potential of the Gjøa Field.

Secondary objectives for the well were to:

* Confirm fluid contacts as observed in well 35/9-2.

* Acquire data for reservoir characterisation, petrophysical and sedimentological data.

* Add information about the aquifer pressure in the Viking Gp. and the Brent Gp.

3 RESULTS

The drilling of well 35/9-4 SX was terminated in the Lista Fm. at 1261m RKB due to severe influx of formation water after the 13 3/8" casing was set and cemented.

The consequences for the Gjøa Project after the termination of well 35/9-4 SX were that none of the well objectives were met. The potential gas and oil volumes of the P3 and P4 segments of the A South structure remain unproved. According to the reference model these volumes are calculated to 7.8 $MMSm^3$ of oil and 5.2 GSm^3 of gas in segment P3, and 5.2 $MMSm^3$ of oil and 1.3 GSm^3 of gas in segment P4.

4 GEOPHYSICS

Table 4.1-1 shows the geophysical prognosis in time and depth values for the formation tops at the well location. The main geophysical events are the Top Shetland Gp, Top Rødby Fm. Top Reservoir (which is defined by the top Sognefjord/Draupne Fms. sands, Ujunc) and the Top Brent Gp.

None of the main geophysical events were penetrated by well 35/9-4 SX. However, an attempt is done to map the areal distribution of the main water producing sand within the Lista Formation, at about 905m MD RKB at the well location. This is shown in Fig. 4.1; "Seismic mapping of Lista sands in well 35/9-4 SX".

5 LOGS

5.1 MWD logs

An MWD service (Baker Hughes Inteq), yielding gamma ray, resistivity and survey measurements was run in the section:

389.5 - 1261 m

Detailed MWD results can be found in the report "END OF WELL REPORT, MWD, FOR NORSK HYDRO, WELL 35/9-4 SX".

5.2 Wireline logs

The following wireline log suite was run by Schlumberger on the well to assist in the interpretation of the waterflow.

CBL/VDL/GR	-	evaluate cement quality behind 30" conductor and 13 3/8" casing
TDT	-	identify flow zones and flow velocity
Temperature	-	indicate mud temperatures in the well

The responses on the temperature logs run during the killing operations, are further discussed in section 6.5; "Revised Formation Temperature".

6 PORE PRESSURE AND FORMATION TEMPERATURE

6.1 Prognosed Pore Pressure

No shallow gas has been encountered in the tie-wells 35/9-2 and 36/7-1 .

No shallow gas warning was given for the proposed location for well 35/9-4 SX, but caution was advised when passing through the reflector mu_PleiR4 at 535.5 m ± 5 m RKB.

Based on the site survey report, a normal hydrostatic pressure was expected in the Nordland and Rogaland Group down to 1261 m in well 35/9-4 SX.
The plan was to spud and drill with 1.03 sg seawater and 1.07 sg Hi Viscosity pills down to 450 m and displace the hole with 1.20 sg mud before running the 30" conductor. Drill 17 1/2" hole with 1.03 sg seawater and viscous pills to 1261 m and displace the hole with 1.30 sg mud before running the 13 3/8" casing.

6.2 Revised Pore Pressure

As a consequence of the water flow experienced in the 17 1/2" section, the pore pressure prognosis was revised (see Fig. 6.1). The revision is mainly based on results from the attempts to control the water influx in the well. No MDT for pressure measurements was run in this well.

Two sandy pressurised zones with water influx were registered in this well.

1 Quaternary Sands:	550 - 600m.
2 Intra Lista Fm. Sands:	875 - 987m.

Prior to run 13 3/8" casing, the hole was displaced to 1.20 sg mud. There were indications of an unstable well. It was necessary to work tight spots during the wipertrip. The mud weight was rised to 1.30 sg and there was no indication of flow from the well. Due to tight hole when running casing, it was required to circulate the casing down using seawater. Consequently, the well was displaced to 1.03 sg seawater. The well started to flow at this stage. This indicates that the 1.30 sg mud column at top of sandy intervals at 550 and 875m, controlled a maximum pore pressure of 1.07 sg and 1.15 sg, respectively.

Later attempts to control the waterflow by injecting 1.60 sg killmud through perforations at 580 m and 565 m proved the mudweight to be sufficient to stop the well from flowing. This indicated that the 1.60 sg mud column controlled a maximum pore pressure of 1.15 sg at 550 m and 1.13 sg at 875 m.

Based on well stability observations with 1.20 sg, 1.30 sg and 1.60 sg mud in the hole, the pore pressures are calculated to between 1.04 - 1.07 sg in the Eocene sand interval of Hordaland Gp (550 - 600 m), and 1.10 - 1.13 sg in the Intra Lista Fm. sand interval (875 - 987m). These intervals corresponds with the interpreted sandlayers in the "Post Site Survey Report" (see chapter 7, this report).

6.3 Revised Fracture Gradient

The fracture gradient has been revised over the drilled interval down to 1261m according to the revised pore pressure. All calculations are done by using the formulas of "Breckels and van Eekelen".

Attempts to establish circulation behind 13 3/8" casing through perforations at 780 m failed due to borehole collapse. However, the attempt resulted in fracturing the formation, and a fracture gradient of 1.47 sg was obtained. The gradient is significantly higher than prognosed. This result can not be characterised as quality LOT at this levels, due to the non-optimal conditions during performance.

6.4 Revised Overburden Gradient

No density log was run in the 35/9-4 SX well, therefore no revisions of the overburden gradient has been done.

6.5 Revised Formation Temperature

No revision of the static formation temperature has been done. The temperature logs which were run during the kill-operation, showed minimum temperatures in accordance with the prognosed temperature gradient of 4.2°C/100m, see Fig. 6.2.

However, the logs showed considerable increased temperatures than the prognosed in the intervals 560 - 600 m and 900-940 m, see Fig. 6.2. These intervals coincide with the zones of hot water influx from the Quaternary Sand and Intra Lista Fm. Sand respectively. The maximum logged temperature was 39.9°C at 909.5 mMD.

7 POST SITE SURVEY REPORT FOR WELL 35/9-4 SX, NOCS

Well Data :

1	Distance from rig floor to sea level:	23.5m
2	Water depth (MSL):	364.0m
3a	Setting depth for conductor (m RKB):	449m
3b	Leak Off / Formation Integrity Test (g/cc):	N.A.
4a	Setting depth (mRKB) for casing on which BOP mounted:	1255.5m
4b	Formation Integrity Test (g/cc):	N.A.

5 Depth (m RKB & Two Way Time) to formation/section/layer tops:

Base Quaternary / Top Tertiary	:	559m (684ms)
Top Balder Formation	:	605m (734ms)
Top Sele Formation	:	642m (c. 770ms)
Top Lista Formation	:	723m (848ms)

Note - No chronostratigraphic information was collected from the well (i.e. from seabed down to TD at 1261m RKB). The interpretation of the different formations is therefore based on the correlation with the 35/9-2 tiewell. Well data is restricted to gamma ray and resistivity data alone.

6 Depth interval (m RKB & Two Way Time) and age of sand bodies shallower than 1000 m under the seabed. Note which layers if any contain gas:

Note - No data exists on background gas levels from the seabed down to 1261m RKB (section drilled with returns to seabed). However, no gas related incidents were reported over this interval.

Quaternary
550m - 551m (c. 674ms - 675ms)

Tertiary

Hordaland Group

559m - 567m (c. 684ms - 693ms) - Sands assoc. with **Shallow Water Flow** (see sect. 15).
585m - 594m (c. 712ms - 722ms) - -"-

Balder/Top Sele Fm

597m - 614m (c. 725ms - 743ms)
619m - 651m (c. 748ms - 778ms)

Sele Fm
664m -669m (c. 791ms - 796ms)

Lista Fm
832m - 843m - Sands associated with **Shallow Water Flow** (see section 15).
874m - 876m - -"-
903m - 907m - -"-
919m - 922m - -"-
929m - 931m - -"-
938m - 941m - -"-
966m - 967m - -"-
981m - 985m - -"-

7 By what means is the presence of gas proven: N/A

8 Composition and origin of gas: N/A

9 Describe all measurements taken in gas bearing layers: N/A

Seismic Data:

10 Given depth (m RKB & ms Two Way Time) of unconformities at the well location:

Base Quaternary / Top Tertiary	:	559m (684ms)
Top Balder Formation	:	605m (734ms)
Top Sele Formation	:	642m (c. 770ms)
Top Lista Formation	:	723m (848ms)

11 Given depth (mRKB & ms TWT) and extent of sand layers (communication, continuity, truncation etc.):

Quaternary

550m - 551m (c. 674ms - 675ms):

Thin sand found within well stratified unit at base of Pleistocene sequence. Unit extends across entire survey area and a similar sand was recorded in the 35/9-2 tiewell. Sand thought to have good continuity.

Tertiary

Hordaland Group/Balder/Top Sele Fm.
559m - 567m (c. 684ms - 693ms),
585m - 594m (c. 712ms - 722ms),
597m - 614m (c. 725ms - 743ms),
619m - 651m (c. 748ms - 778ms):

Sands found within steeply dipping unit truncated at the well location by the Base Quaternary unconformity. Unit deepens to west and is characterised by frequent high-angle faults.

Sele and Lista Fm's.
664m -669m (c. 791ms - 796ms),
832m - 843m,
874m - 876m,
903m - 907m,
919m - 922m,
929m - 931m,
938m - 941m,
966m - 967m,
981m - 985m:

Interval shows similar structure to the Balder/Top Sele interval described above. However, owing to regional dip, sand are truncated further to the east. The interval is once again highly faulted.

12 Given depth and extent of any gas blanking ("gass-skygging"), seismic anomalies etc.:

Anomalous high amplitude reflections were mapped and evaluated at 3 main levels within the shallow section, between 512m and 632m below MSL (535.5m - 655m RKB). The anomalies at all three levels were interpreted as being due to a change in lithology, although the presence of gas at one level, was not discounted. No gas warning was issued for the proposed well but caution was advised at one level (512m MSL, 535.5m RKB).

No gas related problems were experienced in the well.

13 Note any indication of gas originating from deeper levels. Give description in cases where gas comes from deeper layers: N/A

14 How does the interpretation of the site survey correspond to the well data with respect to:

- Shallow Gas:

  The 35/9-4 SX site and proposed well location were interpreted as being free of gas hazards. No gas related problems were experienced in the well and there are no indications of gas in the tophole logs.

- Sand Bodies:

  The prognosed versus recorded results show good agreement and no unexpected sands were encountered in the well. The top of the main sandstone interval at 559m RKB was however, encountered 34m shallower than predicted.

- Boulders:

  Boulders were reported in the shallow Pleistocene section (see Drilling DPR, and "Operations", sect.B this report) This did not significantly affect the drilling operation.

The existence of boulders was addressed in the site survey report and based on correlation with the 35/9-2 well, were considered most likely to be found between 397m and 474m MSL (420.5m - 497.5m RKB).

- Unconformities (depths in metres RKB) :

	Prognosed	Observed	Difference (refers to observed depths)
Base Quaternary / Top Tertiary	569.5	559	10 shallower
Top Balder Formation	-	605	-
Top Sele Formation	655	642	13 shallower
Top Lista Formation	751	723	28 shallower

The observed depths to the main unconformities are all slightly shallower than prognosed, although one (i.e. Top Lista) fell outside the stated levels of accuracy. The depth to Top Balder was not prognosed.

- Correlation :

The lithostratigraphy recorded over the tophole section of the 35/9-4S well was as predicted and similar to the 35/9-2 tiewell. The log response in the shallow section was similar for both wells and enables good correlation between the two.

15 Drilling problems not addressed by site survey report:

- Shallow Water Flow :

The problem of shallow water flow is not routinely addressed by site survey reports and was not discussed by the 35/9-4 SX report. Shallow water sands were however encountered in the well and as a result of lost time, led to the plugging and abandoning of the well before the target depth had been reached.

Shallow water flow was experienced in two intervals within the shallow top hole section:

Interval, m RKB	Interval, m MSL	Stratigraphic Level
c. 559-600 m	535-576.5 m	Eocene Sands (Hordaland Group) - interval occurs directly beneath Base Quaternary unconformity
c. 875 - 985 m	851 - 961 m	Lista Formation Sands

The source of the shallow water flow between 559m and 600m can be tied to a sand-rich interval which, at the well location, is truncated by the Base Quaternary unconformity. The interval dips steeply down to the west and is characterised by numerous high-angle faults, thought to have formed in response to overpressure and dewatering. The faults do not cut the Base Quaternary unconformity which appears to be forming an effective seal.

The source of the deeper water flow may be a water-saturated horizon, identified by the following AVO analysis of the high resolution seismic. This reflector is thought to coincide with a sand layer found at a depth of 903m RKB.

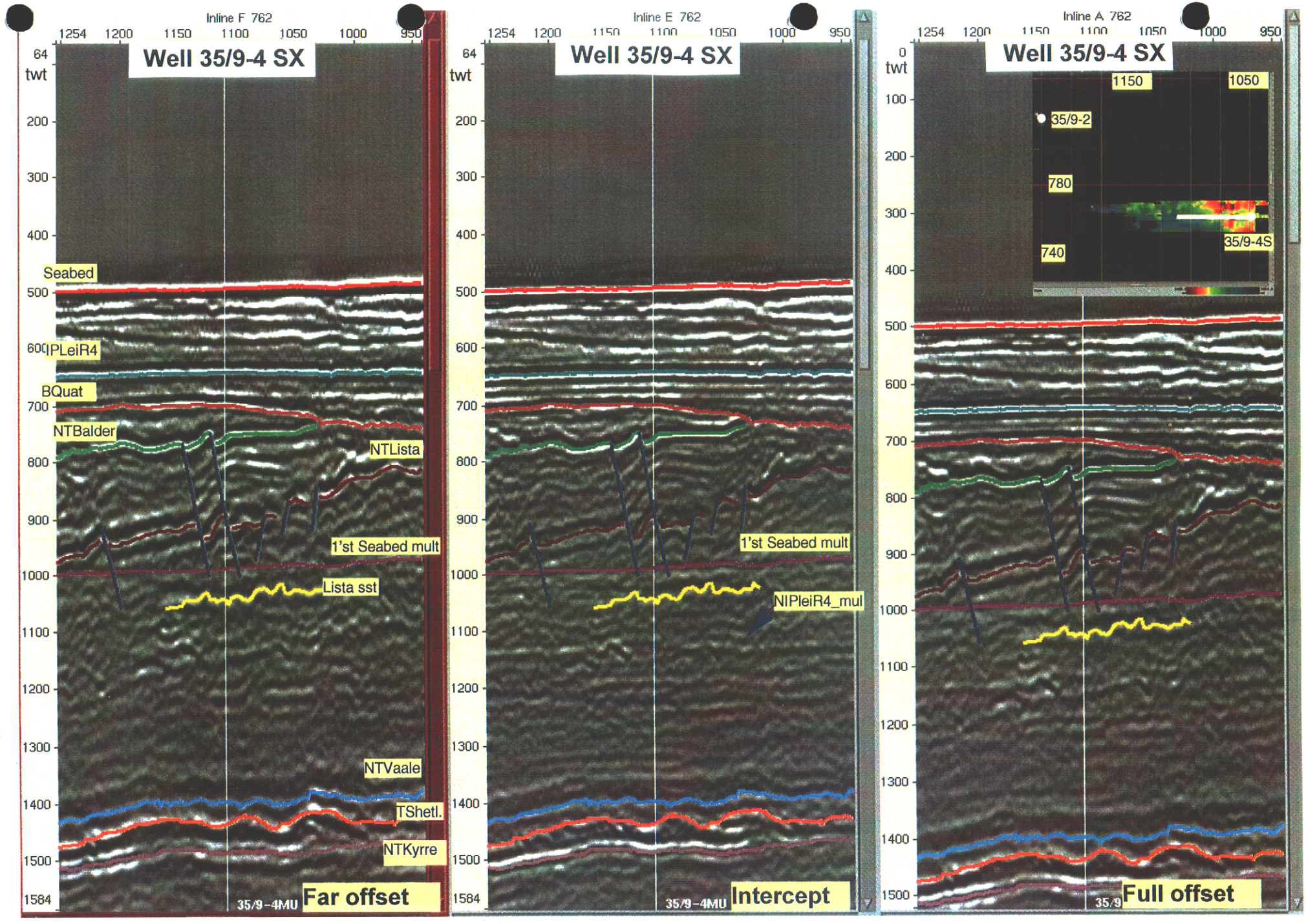
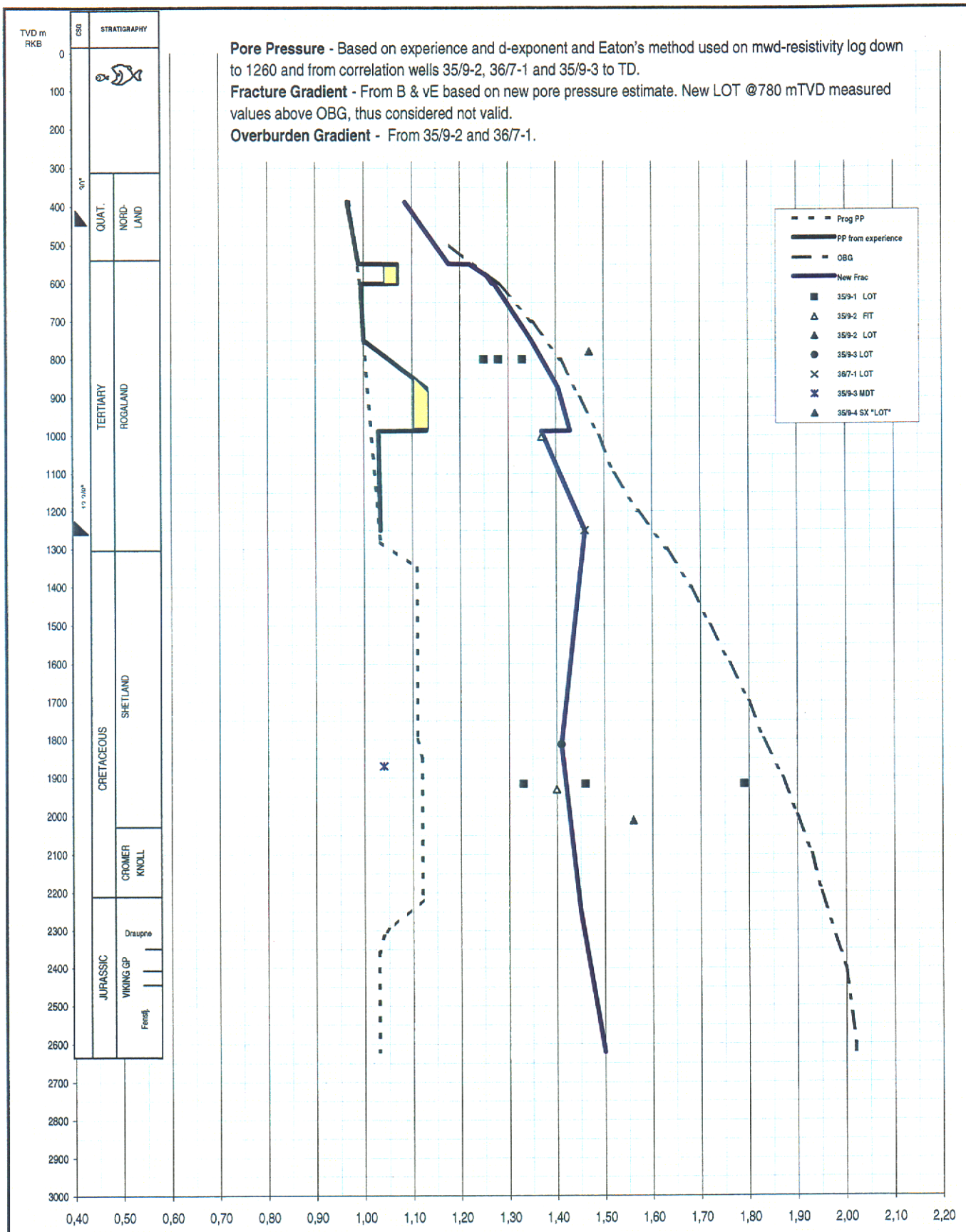


Fig. 4.1 Seismic mapping of Lista sands in well 35/9-4 SX

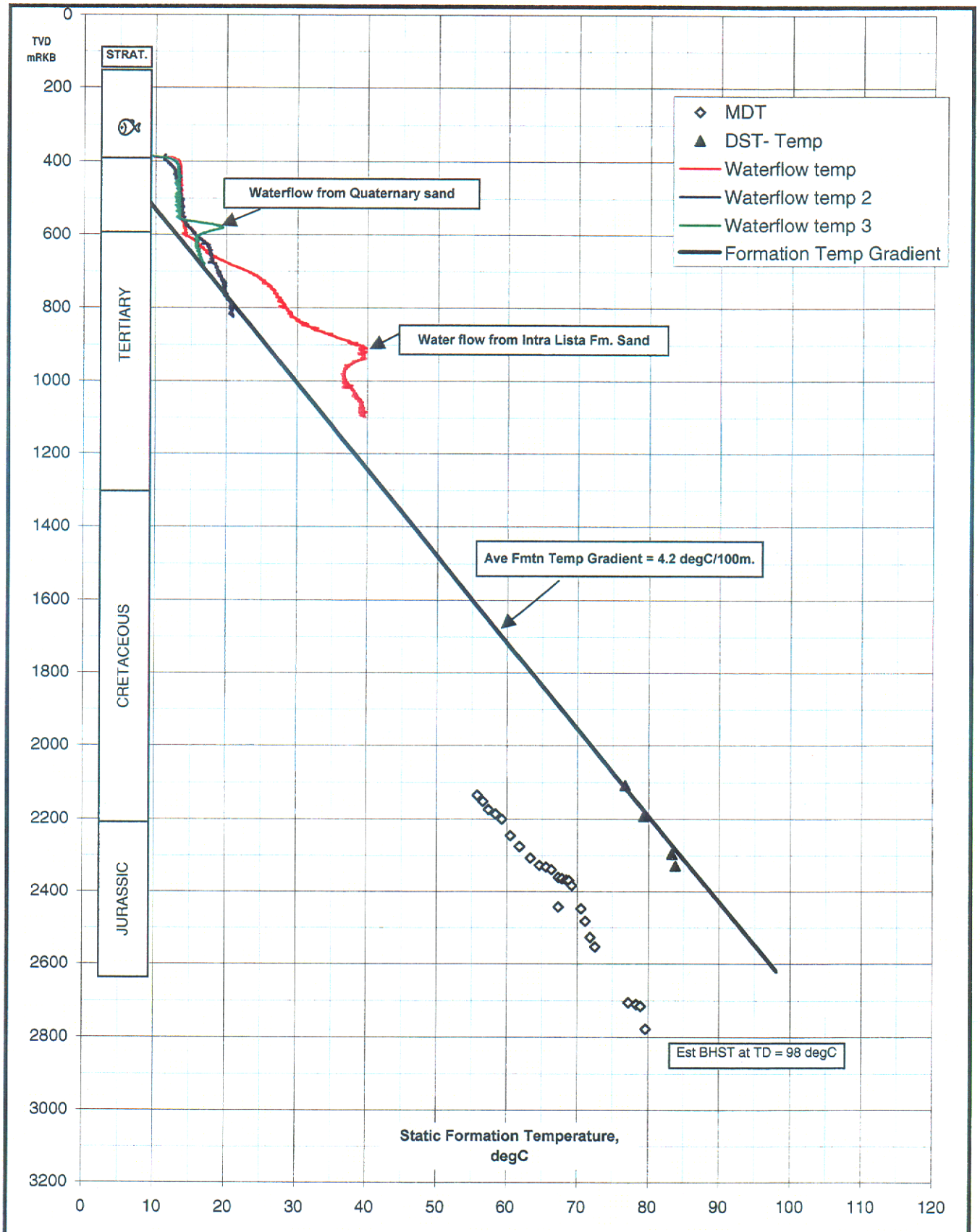
FORMATION	Time ms	Depth mTVDSL	Depth mTVD RKB	Depth uncert. +/-m	X-UTM	Y-UTM	inline	xline
Sea bed	493	366	390	2	551680	6799606	762	1111
Top Shetland	1434	1287	1311	30	551680	6799606	762	1111
Top Rødby	1944	1998	2022	40	551680	6799606	762	1111
Top Draupne lower Cret.wedge	2046	2179	2203	45	551726	6799606	762	1102
T. Sognefj./Draupne sst.	2108	2272	2296	50	551850	6799606	762	1097
Top Fensfjord unit 3	2270	2551	2575	60	552113	6799606	762	1076
Top Brent	2438	2866	2890	65	552350	6799606	762	1057
Top Basement	2557	3107	3131	70	552440	6799606	762	1050

KB 23.5 m

Pore Pressure - Based on experience and d-exponent and Eaton's method used on mwd-resistivity log down to 1260 and from correlation wells 35/9-2, 36/7-1 and 35/9-3 to TD.
Fracture Gradient - From B & vE based on new pore pressure estimate. New LOT @780 mTVD measured values above OBG, thus considered not valid.
Overburden Gradient - From 35/9-2 and 36/7-1.



Final well Report 35/9-4 SX	Figure: 6.1 Revision: 2 Date: 19/8-98	**Revised pore pressure, fracture- and overburden gradient**	HYDRO



Final well Report 35/9-4 SX	**Figure: 6-2**	**Revised Formation Temperature Gradient**

HYDRO

APPENDIX

WELL SUMMARY

WELL SUMMARY

Coord: 61°19' 32.50"N UTM: 6 799 609.4 mN
03°57' 55.23"E 551 677.2 mE
Zone: ED-50 UTM Zone 31 CM 3° E

Line: NH 9301, In line: 1156, x-line: 1642

Rig: Transocean Leader

Waterdepth: 364 m MSL **KB:** 23.5 m

Stopped in: Rogaland Gp

On location: 11.07.98
Spudded: 12.07.98

At TD: Not reached.
Completed:

PTD Driller: 1261m
TD Logger:

Wireline Logging: Schlumberger
Mudlogging: BHI

WELL:

35/9-4 SX

COUNTRY:

Norway

OPERATOR: NORSK HYDRO LICENCE 153 OWNED BY: HYDRO / STATOIL / NORSKE SHELL/ SAGA / DEMINEX

TARGETS: Jurassic

Primary: Sognefjord/Fensfjord Fms

Secondary: Geological Information

Results:
Water kick experienced in the top hole section. Killed and abandoned well before planned TD at 3347mMD/3074mTVD in Statfjord Fm.

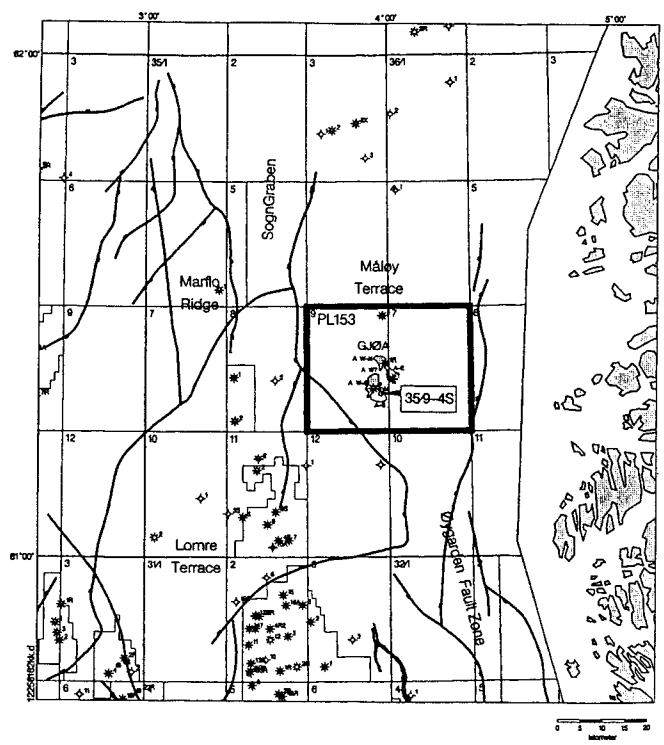
CASING

30" at 449 mRKB
13 3/8" at 1255.5 mRKB

CORES

GAS RECORD

387.5 - 1261m: returns to seabed



LOGS

MWD/GR/RES
CBL/VDL/GR/AMS
TDT

OIL SHOWS

LIST OF CONTENT

OPERATIONS SUMMARY

All depths referenced to RKB, 23.5 m above MSL. Seabed was located at 363 m.

The semi submersible rig Transocean Leader left the location of well 24/6-2 at 11:30 hours on August 7th 1998 for drilling of the exploration well 35/9-4 S on Gjöa. The rig went to sheltered waters at Stord for thruster repair before it continued to Gjöa.

A total of 34.9 days were spent drilling to 1261 m, control a shallow waterflow and permanently abandon the well. This includes 3.4 days of rigmove and planned rig repairs.

1.1 Positioning

The rig arrived at location the 11th of August at 21:00. All anchors were run and tested in 24 hours. Anchor no.8 had to be reset due to slipping during pretensioning.

The position / co-ordinates of the wellhead:

61¤19' 32.50" N 3¤ 57' 55.23" E

1.2 36" section

Total depth of section: 451 m.

Total time used: 39.5 hrs (1.6 days) Operational time: 29.5 hrs (75%)
Downtime: 10 hrs (25%)

Drilling

Spudded the well at 22:00 on August 12th. The section was drilled with 17 1/2" bit and 36" hole opener using sea water and viscous pills for hole cleaning.

Conductor

The hole was displaced to 1.20 sg mud before the 30" conductor, 30" conductor housing and guide base was run. After cementing the status of the cement on the outside was tested with a 3 1/2" drillpipe stinger. This showed that a grouting job was required, which was successfully conducted.

1.3 17 1/2" section

Total depth of section: 1261 m.

Total time used: 608.5 hrs (25.4 days) Operational time: 127 hrs (21%)
Downtime: 481.5 hrs (79%)

Drilling

The conductor was drilled out with a 26" bit. Drilling continued to 1261 m with a 17 1/2" bit. The hole was drilled with sea water and viscous pills for hole cleaning. Experienced some tight hole problems on the wiper trip prior to running the 13 3/8" casing.

Casing

The hole was displaced to 1.3 SG mud (KCl-polymer) before casing running. Casing running progressed as normal down to 600 m, where tight hole was encountered and the casing had to be circulated through the tight spot. The casing was circulated through the tight spot by pumping seawater. From 800 m depth to TD the casing was run conventionally.

While running the casing the ROV observed a small flow from the well best described as a tin rag of smoke around the well.

With the casing at TD a regular surface casing cement job was conducted. The cement volume pumped was sufficient to cover the complete length of the casing plus ample excess. Did not bump the cement viper plug.

After cementing the visibility in the vicinity of the wellhead got poorer and after an attempt to clean drill cuttings from the wellhead it became evident that the well was flowing water from the 30" x 13 3/8" annulus. The flow rate out of the hole was not large, only enough to reduce the visibility around the wellhead.

The BOP and marine riser was installed without major difficulties.

To evaluate the status of the cement job and to get an indication from where the water was flowing it was decided to run a CBL-Temperature log. This indicated poor cement quality from 1000 m to 700 m and no cement further up. The temperature log indicated that the main source was a sandy interval between 550 m and 600 m with a not insignificant contribution from a deeper zone at around 900 m.

The first attempt to kill the well was done through perforations at 580 m. 80 m3 of 1.6 SG kill mud were pumped into the annulus followed by 20 m3 lead cement slurry and 40 m3 Microblock tail cement slurry. The well was static for 3 hours after cementing, but started flowing again while the cement was setting up, during the critical transition between fluid and solid phase when the cement looses it's ability to transfer hydrostatic pressure.

Shortly after this the ROV observed a large and rapid build-up of sand around the well. The top of the sand pile built up to the lower pipe ram on the BOP, approximately 6 m above seabed level. The amount was roughly estimated to be in excess of 1000 m3.

It was decided to try a deeper approach and the cement and retainer were drilled out. The casing was perforated at 850 m and 5 m3 green dye and 80 m3 1.6 SG mud was pumped. The dye was not observed in the returns at the seabed. While building mud for a new kill attempt, it was observed that the well was still flowing at the same rate as before the last kill attempt. 354 m3 of 1.6 SG mud was then pumped at a high rate, but the well was still flowing water at the wellhead.

The negative result of this kill attempt was evaluated to be caused by insufficient volume and pumping rate.

For the next kill attempt it was planned to go for maximum volume (2000 m3) and pumprate (+6000 LPM). A TDT log indicated that both zones were still producing, but the contribution from the lower level was reduced.

The casing was perforated at two, 2 m levels at 780 m and 750 m. A retrievable packer was run on 6 5/8" drillpipe and set at 768 m between the two perforated zones. The annulus between drillpipe and casing was displaced to seawater from the packer and up and by closing the BOP a continuos column of water was obtained from the upper perforations to the choke manifold. The choke pressure was used for pressure monitoring the annulus (17 1/2" x 13 3/8") while pumping kill mud in to the lower perforations. This attempt to kill the well was aborted after having pumped

only 0,5 m3 when it came clear that there was no communication to the seabed. A cement retainer was set at 740 m followed by a cement plug from 740 m to 670 m.

A new TDT log was run indicating reduced contribution from the lower zone and it was decided to hold on to the same general plan; first kill the flow and secondly seal off with cement. It was considred important to go as deep as possible to get the required hydrostatic head and at the same time be sure to have communication to seafloor.

The casing was perforated at two, 2 m levels at 565 m and 550 m. A retrievable packer was run on 6 5/8" drillpipe and set at 559 m between the two perforated zones and the waterflow was killed by pumping a total of 1300 m3 1.6 SG kill mud through the perforations at 565 m. The well was stable and cement was pumped through the perforations with returns back to seabed,. While observing the wellhead and waiting for the cement to set up the well started flowing once again.

Shortly after the flow had started, an attempt to kill the well with the remaining killmud did not shut the flow off. Neither did the following cement job.

Observations with the ROV's video camera indicated a reduced flowrate, although it was difficult to quantify. A TDT log also indicated reduced flow.

The casing was perforated at two, 2 m levels at 535 m and 520 m. A retrievable packer was run on 6 5/8" drillpipe and set at 527 m. 30 m3 2.05 SG kill mud was pumped through the perforations at 535 m. The flow was at this time significantly reduced and occasionally it could not be observed by the camera. (Whether it stopped or found another path is unclear.) 7 m3 cement was pumped through the perforations and a cement plug was set from 510 m to 440 m.

The casing was perforated at 455 m, a cement retainer was set at 445 m and 40 m3 of cement was pumped through the perforations.

The casing was perforated at 437 m, a cement retainer was set at 429 m and 24 m3 of cement was pumped through the perforations.

No flow was observed at the wellhead after this.

1.4 Permanent plug and abandonment

Total time used: 42.5 hrs (1.8 days) Operational time: 42.5 hrs (100%)

A top cementplug was set from 429 m to 404 m. Pulled BOP and marine riser, cut off the 30" conductor and 20" extension at 392 m and retrieved the wellhead.

Transocean Leader left the 35/9-4 S location at 9:30 August 12th 1998, heading for 6305/1-1 (Ormen Lange).

DAILY REPORT ON WELL 35/9-4 SX

Daily report no : 1 **Date:** 1998-07-08
Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 0,00 sg

Stop time	Description
11:30	Commenced tight tow to Stord for rig repair.
23:59	In transit from well 24/6-2 to Stord for repair.

Daily report no : 2 **Date:** 1998-07-09
Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 0,00 sg

Stop time	Description
09:30	Tight tow to sheltered location at Stord for rig repair. Passed the 12 mile limit at 02:30 hrs.
13:00	Commenced anchor handling.
23:59	Commenced repair to staboard #1 tank and removal of #3 thruster.

Daily report no : 3 **Date:** 1998-07-10
Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 0,00 sg

Stop time	Description
15:00	Repaired #1 tank and removed #3 thruster.
21:00	Off-loaded the spud equipment.
23:00	Pulled the anchors #3, #7 and #4.
23:59	Commenced tight tow towards location.

Daily report no : 4 **Date:** 1998-07-11
Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 0,00 sg

Stop time	Description
20:00	Towed towards 35/9-4 S location. On location at 20:00 hrs.
21:00	Shortened the tow line - commenced run onto location.
23:59	Ran anchors.

Daily report no : 5 **Date:** 1998-07-12
Midnight depth : 410 m MD **Estimated PP:** 1,03 sg **Mud weight:** 0,00 sg

Stop time	Description
06:00	Ran anchors.
12:00	Ballasted the rig to drilling draft (23.5 m).
21:00	Commenced pre-tensioning of the anchors. Anchor # 8 slipped. Picked up #8 and re-ran. Pre-tensioned #8.
21:30	Positioned the rig onto location.
22:00	Tagged the seabed at 387.5 m (corrected). ROV positioned two marker buoys and 1 transponder on the seabed.
22:30	Drilled 17 1/2"/36" hole from 388 m to 391 m.
23:00	Rectified fault on the MWD tool surface equipment.
23:59	Drilled the 17 1/2" / 36" hole from 391 m to 410 m. Pumped 8 m3 high viscous mud every 15 m. Surveyed every 10 m.

Daily report no : 6 **Date:** 1998-07-13
Midnight depth : 451 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,03 sg

Stop time	Description
06:00	Drilled 17 12" / 36" hole from 410 m to 440 m.
09:00	Reamed repeatetly to bring the hole angle below 1.5 deg
11:30	Contiuned to drill 17 1/2" / 36" hole from 440 m to 451 m.
13:00	Reamed repeatedly the interval from 436 m to 451 m to reduce the hole angle.
13:30	Pulled out of hole to 393 m and reamed the hole.
14:00	Ran in hole to fill at 449 m and washed down to 451 m.
14:30	Displaced the hole to 1.20 SG mud.
15:00	Pulled out of the hole with drill pipe.
16:00	Pulled out of the hole and racked back the bottom hole assembly.
16:30	Rigged up to run 30" casing. Held pre-job safety meeting.
18:30	Picked up and tested the 30" shoe joint, made up and ran 3 intermediate and 30" wellhead housing joints.

DAILY REPORT ON WELL 35/9-4 SX

Daily report no : 6 **Date:** 1998-07-13
Midnight depth : 451 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,03 sg

Stop time	Description
20:00	Made up and ran 3 1/2" cement stinger, made up same to the 30" running tool. Made up running tool to casing and installed into the permanent guide base.
21:00	Ran 30" casing on HWDP landing string to 449 m.
22:00	Worked the string and anchors to reduce the bulls eyes on the permanent guide base.
23:00	Pumped 20 m3 seawater spacer, lined up and pumped 3 m3 with the cement unit. Pressure tested cement lines to 200 bar.
23:59	Mixed and pumped cement slurry, displaced the cement with seawater and checked for backflow - no flow.

Daily report no : 7 **Date:** 1998-07-14
Midnight depth : 451 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,03 sg

Stop time	Description
06:30	Waited on cement to set.
07:00	Prepared to release the 30" running tool, centered the rig and released the CART. Bullseyes moved when tension on landing string released.
09:00	Pulled the 3 1/2" stinger out of the 30" and stabbed into the PGB grouting funnels. Tagged cement at 400 m on port side, ran into 407 m on starboard side without tagging cement.
11:00	Rigged up and pressure tested the cement lines. Mixed and pumped cement and displaced the slurry with seawater.
12:30	Pulled out of hole and laid out the CART tool. Racked back the cement stinger.
13:00	Laid down the 17 1/2" / 36" bottom hole assembly.
17:30	Made up and racked back 72 joints of drill pipe.
18:30	Laid out the 30" cement stand, and made up the 13 3/8" cement head and plug launcher assembly.
20:00	Made up and ran in hole with 26" bit and BHA.
21:00	Ran in hole with 5" drill pipe, and tagged top of cement at 444m.
22:30	Drilled firm cement from 444 m to 451 m. The 30" shoe was found on expected depth.
23:00	Pumped 16 m3 high viscous mud and reamed the area from 443 m to 451 m. Pumped 16 m3 high viscous mud
23:30	Pulled out of the hole with 5" drillpipe.
23:59	Pulled out of the hole with BHA.

Daily report no : 8 **Date:** 1998-07-15
Midnight depth : 1025 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,03 sg

Stop time	Description
00:30	Pulled out of the hole with BHA and broke off the 26" bit.
01:30	Picked up the MWD tool configuration, downloaded the tool and initiated it for the next section
03:30	Made up 17 1/2" BHA and ran in hole with the same.
04:30	Ran in hole with 5" drillpipe. Tagged bottom at 451 m.
23:59	Drilled 17 1/2" hole from 451 m to 1025 m. Drilled with seawater and high viscous mud slugs.

Daily report no : 9 **Date:** 1998-07-16
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,03 sg

Stop time	Description
10:00	Drilled 17 1/2" hole from 1025 m to 1261 m.
11:00	Circulated a 6 m3 sea-water / mica pill followed by 24 m3 high viscous mud out of the hole.
12:00	Displaced the well to 1.2 SG mud.
15:00	Pulled out of the hole with drill pipe to 449 m. Had tight spots at 1108 - 1092 m, 990 - 933 m and 890 - 874 m. Backreamed these sections. Had max overpull of 30 ton.
15:30	Ran in hole to a resistance at 896 m.
17:00	Reamed from 896 m to 1051 m.
17:30	Performed a check trip from 1051 m to 896 m and back to 1051 m. Worked the pipe over a ledge at 908 m.
20:30	Reamed the hole from 1051 m to TD at 1261 m. Had 5 m fill.
22:00	Cleaned the hole with 20 m3 of high viscous mud and displaced hole to 1.3 SG mud.
23:59	Pulled out of the hole, worked tight spots at 2051, 963, 936 and 635 m.

DAILY REPORT ON WELL 35/9-4 SX

Daily report no : 10 **Date:** 1998-07-17

Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,03 sg

Stop time	Description
00:30	Pulled out of the hole to 386 m.
01:00	Cleaned of the wellhead area for cuttings.
03:00	Pulled out the hole with the BHA and broke of the bit.
04:00	Rigged up to run casing. Held pre-job safety meeting.
11:30	Picked up the shoe, 2 intermediate joints and float collar joint, and tested the same. Ran 13 3/8" casing to a resistance at 605 m. Attempted to work the casing past 605 m with no success.
13:00	Pulled back to 598 m. Made up 13 3/8" by 4 1/2" swedge to the casing and a stand of drill pipe. Washed the casing down from 598 m to 629 m. Racked back the drillpipe stand.
14:30	Attemted to run the casing further, but was unable to pass 611 m. Pulled back to 598 m.
16:00	Made up a TAM packer circulation assembly to the top drive. Held risk analysis and safety meeting for use of TAM packer.
20:30	Ran 13 3/8" casing, washed down from 605 m to 809 m.
23:00	Ran casing to 856 m without circulation. Made up wellhead housing and continued to run the casing on 5" HWDP. Had to wash and work down the casing. Landed the wellhead and tested with 20 tonn overpull.
23:30	Circulated 80 m3 seawater.
23:59	Rigged up and pressure tested cementing lines to 300 bar. Dropped the ball and released the bottom plug.

Daily report no : 11 **Date:** 1998-07-18

Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,03 sg

Stop time	Description
04:30	Mixed and pumped lead and tail cement slyrry. Displaced the cement with seawater. Did not bump the plug.
06:00	Released the wellhead running tool and jetted the guide-base. Waited on improved visability to inspect the guidebase bullseyes - no improvement.
07:30	Pulled the landing-string. Laid out wellhead running tool and TAM packer assemblies.
14:30	Ran in to the wellhead with open ended drillpipe. Waited on improved visability - got no improvement. The ROV identified water flow from the 13-3/8"x30" annulus causing poor visability.
16:00	Ran bullnose jetsub on drillpipe, entered the wellhead and jetted the same. Pulled out with the jetsub assembly.
17:30	Rigged down topdrive torque wrench. Rigged up riser handling equipment.
19:30	Installed riser spider, prepared BOP running equipment and held pre-job safety meeting and SJA.
21:30	Picked up 5 ft booster joint, double joint of riser, connected to BOP and installed MUX cables and guide wires.

Daily report no : 12 **Date:** 1998-07-19

Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,03 sg

Stop time	Description
00:30	Continued to connect service lines and performed final check on BOP.
01:30	Ran BOP into the water on marine riser. Made up and ran 60 ft riser joint.
02:30	Tested the choke, kill and conduit lines to 35/345 bar for 5/10 min
08:30	Continued to run BOP on marine riser
09:30	Pressure tested choke, kill and conduit lines to 35/345 bar 5/10 min.
15:00	Continued to run BOP on marine riser.
16:30	Found a damage on the marine riser conduit line nipple joint, replaced the nipple.
20:00	Continued to run BOP on marine riser.
23:59	Made up slip joint and landing joint. Installed kill, choke and booster lines goose necks, conduit lines and MUX cables.

Daily report no : 13 **Date:** 1998-07-20

Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,61 sg

Stop time	Description
02:00	Continued to make up kill, choke, booster lines and service lines.
02:30	Pressure tested choke, kill and conduit lines to 35/345 bar for 5/10 min.
03:30	Engaged riser load ring - reinstated #1 rucker wire.
04:00	Landed BOP - checked bulls eyes. Latched BOP and confirmed with 25 tonn overpull.
04:30	Pressure-tested the wellhead connector, blind-shear ram and 13 3/8" casing to 120 bar.
06:30	Unlocked slip joint and laid out landing joint. Installed diverter.
08:30	Completed rigging down of riser running equipment. Rigged up 350 ton drilling equipment.
14:30	Rigged up Schlumberger. Complete CBL-Temp log from 1100 m - 390 m. Rigged down Schlumberger.
16:30	Laid out 17 1/2" equipment, picked up 12-1/4" equipment.
18:00	Made up 9 5/8" cement head assembly and racked back same.

DAILY REPORT ON WELL 35/9-4 SX

Daily report no : 13 **Date:** 1998-07-20
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,61 sg

Stop time	Description
20:30	Made up 9 5/8" casing hanger / cement plug assembly and racked back same.
21:30	Serviced topdrive and lubricate the rig.
23:59	Rigged up Schlumberger. Ran in hole to perforate at 580 m.

Daily report no : 14 **Date:** 1998-07-21
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,65 sg

Stop time	Description
01:30	Completed perforating 13 3/8" casing at 581 m - 579 m. Pulled out and rigged down Schlumberger.
04:00	Made up BJ parabow cement tool. Ran in hole on drillpipe and set the parabow at 587 m.
05:30	Closed the annular and established injection rates. Pumped dye to establish communication / hole size. Pumped 80 m3 / 1.6 SG kill mud . Observed mud returns after 46 m3 pumped.
07:30	Rigged up and pressure tested cement lines to 100 bar. Mixed and pumped 20 m3 of 1.9 SG lead cement followed by 40 m3 of 1.8 SG microblock tail cement. Displaced with 5.5 m3 seawater, checked for backpressure - none.
08:00	Stripped back to 497 m. Checked for backpressure - none.
16:00	Waited on cement while moving pipe every 15 min. The well was static until 10:30hrs. The flow recommenced, slugged then returned to intial continuous rate from approximately 16:00hrs.
17:30	Opened the well and function tested both pods, including 2 acoustic functions.
20:00	Pulled out to the BOP and jetted the same. Pulled out of the hole and laid out parabow running tool.
22:00	Made up BHA to drill out cement plugs, and racked back in derrick.
23:30	Prepared 500 ton equipment for unlatching BOP.
23:59	Ran in hole with BHA to drill out cement plug.

Daily report no : 15 **Date:** 1998-07-22
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,20 sg

Stop time	Description
01:00	Ran in hole and tagged cement top at 547 m.
02:30	Drilled hard cement and BJ parabow to 587 m.
03:30	Swept the hole clean with 5 m3 high viscous mud. Flowchecked the well.
04:30	Ran in hole to 1108 m - took weight.
05:30	Washed down and tagged top of cement at 1200 m.
07:30	Flowchecked and displaced the well to 1.20 SG mud.
08:00	Flowchecked and pumped slug.
09:00	Pulled out of the hole with 5" drillpipe.
10:00	Pulled out of the hole with BHA.
10:30	Rigged up Schlumberger. Held safety meeting
13:30	Made up one 6 ft perforation gun with 6 SPF. Ran in and perforated the casing at 850 m.
14:00	Rigged down Schlumberger
18:00	Made up, ran and set BJ cement retainer at 840 m.
19:00	Established circulation through perforations. Pumped 5 m3 dye.
19:30	Pumped 80 m3, 1.6 SG mud. No dye was observed in the returns from the well at the wellhead.
23:59	Monitored flow at seabed while building 230 m3 new 1.6 SG mud in the surface tanks.

Daily report no : 16 **Date:** 1998-07-23
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,20 sg

Stop time	Description
05:30	Built 200 m3, 1.6 SG mud in the surface tanks.
13:30	The well was shut in. The drill-string was stung into the cement retainer at 840 m and the annular preventer was closed. Observe flow from the well at the wellhead.
16:00	Attempted to kill the well. Pumped 354 m3 of 1.6 SG mud.
23:59	The well was shut in. Observed that the well was flowing into the 13 3/8" casing annulus (from below the cement retainer).

Daily report no : 17 **Date:** 1998-07-24
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
00:30	The well was shut in. Recorded pressures while building 1.6 SG mud in the surface tanks.

DAILY REPORT ON WELL 35/9-4 SX

Daily report no : 17 **Date:** 1998-07-24
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
01:00	Displaced the drillstring to 1.2 SG mud and observed pressures.
02:00	The well was shut in. Established SIDPP to be 23.8 bar and SICP 11.7 bar.
02:30	Displaced the drillstring to 1.6 SG mud. Observed SIDP pressure returned to zero.
03:30	Displaced the kill-line to BOP with 1.6 SG mud. Unstung the drillstring from the cement retainer.
04:30	Killed the well using Drillers Method. Circulated the well to 1.6 SG mud.
09:00	Observed the well. Opened choke line and monitored zero returns.
10:00	Displaced the riser to 1.6 SG mud.
11:30	Opened the annular preventer and observed that the well was static.
12:30	Circulated bottoms up, the well was still static.
15:00	Pulled out of the hole.
19:00	Rigged up Schlumberger wireline and ran temperature log.
21:00	Waited on Schlumberger logging tool. Monitor static well.
23:30	Rigged up Schlumberger TDT tool.
23:59	Ran Schlumberger TDT tool in hole.

Daily report no : 18 **Date:** 1998-07-25
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
08:00	Ran Schlumberger TDT tool. Logged up from 840 m.
11:30	Made up cement stand and tested surface equipment.
19:00	Rigged up Schlumberger. Made up and ran 13 3/8" bridge plug on wireline. Rigged down Schlumberger.
20:00	Ran open ended 5" drillpipe. Tagged the bridge plug at 830 m RKB.
21:00	Displaced 1.6 SG mud out of hole with seawater.
22:30	Flow-checked the well. Gained 2 m3 in the first hour. The flow was then reduced to zero.
23:30	Pulled out of the hole with the drillstring. Monitored that the hole fill was correct.
23:59	Rigged up Schlumberger wireline.

Daily report no : 19 **Date:** 1998-07-26
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
02:30	Held toolbox safety meeting with the rig crew. Rigged up and ran Schlumberger 3 3/8" perforation gun. Correlated to depth and fired the guns with mid tool at 781 m. Pulled the perforating tool out of the hole.
03:30	Monitored the well while Schlumberger rigged up a second 3 3/8" perforation gun.
05:00	Held toolbox safety meeting with the rig crew. Rigged up and ran Schlumberger 3 3/8" perforation gun. Correlated to depth and fired the guns with mid tool at 750 m. Pulled tool out the of hole.
09:00	Made up Weatherford 12.25" OD taper mill. Ran in hole on 5" drill pipe to perform a gauge run to 830 m. The well was shut in when the mill was at 740 m to check suspected flow. No flow was observed.
09:30	Rotated the assembly past perforations at 750/752 m and 780/782 m and continued to bottom at 820 m.
13:00	Pulled out of the hole with the taper mill assembly. Established flow rates with the assembly at 496 m.
14:00	Make up a 5" drillpipe stand for circulation operations and racked it back.
15:00	Picked up and made up a BJ Mod 1223 packer with one joint 5" drill pipe below.
22:00	Picked up from deck 76 joints 6 5/8" drill pipe and ran the BJ packer in the hole.
22:30	Picked up one joint 5" drillpipe, two pup joints and made up to circulation stand to space out for packer setting.
23:00	Set the packer at 768.5 m. Set down 20 ton weight on the packer.
23:59	Rigged up to perform circulation operations. Held toolbox safety meeting.

Daily report no : 20 **Date:** 1998-07-27
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
04:00	Prepared for circulating operations. Transferd mud to / from supply vessel in preparation for well kill operations.
05:00	Attempted to establish circulation through perforations. Pumped 491 liters to achieve 40 bar drillpipe pressure.
05:30	Lined up and pumped down choke line in the annulus above the packer. Pressured up the casing annulus to 40 bar.
07:00	Performed a leak off test down the drillstring, through perforations at 781 m. Packer set at 768.5 m. Pumped 600 liters seawater at 50 l/min for leakoff. The pressure of 55 bar referes to 1.75 SG equivalent mud weight.
07:30	Stopped pumping. The pressure bled back to 36 bar after 10 minutes. 400 l was pumped into formation upon pressure being released at surface.
08:00	Released the packer.

DAILY REPORT ON WELL 35/9-4 SX

Daily report no : 20 **Date:** 1998-07-27
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
10:00	Started to pull out of the hole. Observed back-flow up the drillpipe. Made up topdrive. Allowed the well to stabilise.
12:00	Pulled out of the hole with 6 5/8" drillpipe.
12:30	Layed out the BJ packer.
13:00	Rigged down 6 5/8" drillpipe handling equipment.
13:30	Made up the cement stand and racked it in the derrick.
17:30	Made up a 13 3/8" cement retainer and ran in hole on 5" drillpipe. Set the retainer at 740 m.
19:00	Mixed, pumped and displaced 7 m3, 2.05 SG cement slurry.
20:00	Pulled back out of the hole to 671 m. Circulated down the drillstring.
21:30	Pulled out of the hole.
22:00	Rigged up Schlumberger wireline to run TDT Log.
23:59	Ran Schlumberger TDT log in hole.

Daily report no : 21 **Date:** 1998-07-28
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
12:00	Ran TDT log, 11 stations up from 700 m with GR and FAR detector.
14:30	Ran in hole with Schlumberger 3 3/8" perforation gun and fired. The perforated interval was 567 m to 565 m.
15:00	Closed blind shear rams on the BOP. Pumped seawater with cement pump. Performed injection test through the perforations at 566 m.
17:30	Ran in hole with Schlumberger 3 3/8" perforation gun and fired. The perforated interval was 551.5 m to 549.5 m.
18:30	Made up and ran in hole with Weatherford 12.25" taper mill assembly to 549 m.
19:00	Rotated the assembly past perforations at 549/551 m and 565/567 m.
20:00	Pulled out of the hole with the taper mill assembly.
20:30	Made up BJ Mod 1223 Packer with a 5" drillpipe single below and crossover and safety joint above.
22:00	Ran in hole with the packer on 6 5/8" drillstring.
22:30	Picked up and made up cement stand. Set the packer at 559 m.
23:59	Monitored the well. Noted a loss of 30 m3 per hour through the perforations.

Daily report no : 22 **Date:** 1998-07-29
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
01:30	Monitored the well. Noted losses of 25 m3 per hour through the perforations.
02:00	Established pump pressure using seawater at a pumping rate of 1000 lpm through lower perforations - 4 bar.
04:00	Pumped 15 m3 seawater / dye / mica mix, followed by seawater. Monitored the seabed for indication of returns. Pumped at rates from 1000 to 3000 lpm. The pump pressure at 2000 lpm = 13.2 bar, at 3000 lpm = 26 bar.
07:30	Prepared 1.6 SG mud for mud kill operations. Filled mud pits with extra mud from supply vessel.
15:00	Held prejob safety meeting. Pumped 746 m3, 1.6 SG mud through perforations below the packer at 559 m to kill the water flow in 13 3/8" casing x 17 1/2" hole annulus.
16:00	Shut down pumping to observe pressures. SIDPP = 1.7 bar, SICP = 6.8 bar.
17:30	Continued pumping 1.6 SG mud to the well at 1000 lpm (97.2 m3, 1.6 SG mud was pumped to the well).
21:30	Shut down pumping to observe pressures. SIDPP = 2.0 bar, SICP = 6.0 bar.
23:30	Continued pumping 1.6 SG mud to the well at 1000 lpm (119 m3, 1.6 SG mud pumped to well).
23:59	Shut down pumping to observe pressures. SIDPP = 1.4 bar, SICP = 6.9 bar.

Daily report no : 23 **Date:** 1998-07-30
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
01:30	Shut down pumping to observe pressures. SIDPP 1.4 bar, SICP 6.9 bar.
03:00	Continued pumping 1.6 SG mud to the well at 1000 lpm.
03:30	Opened choke while pumping, allowing 1.6 SG mud into the casing annulus through perforations at 551 m. Observed mud returns continued at seabed.
04:00	Stopped pumping. Observed the well with closed choke. No pressure increases was observed. SIDPP 1.4 bar, SICP 1.2 bar.
05:00	Observed the well with open choke. No gains in trip tank was observed.
07:00	Opened annular preventer and observed the well. SIDPP was 1.4 bar. The well appeared to start flowing at 06:20 hours. Shut annular preventer at 07:00 hours. Continue to monitor the well with the choke line open through to trip tank.
09:00	Monitored the well with the annular preventer closed and choke line open. Trip tank gained further 1 m3 to 08:00 hours. Shut the well in. Record SIDPP 1.7 bar, SICP 1.1 bar. The pressures was stable.

DAILY REPORT ON WELL 35/9-4 SX

Daily report no : 23 **Date:** 1998-07-30

Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
10:00	Pumped 30 m3 1.6 SG mud followed by 25 m3 high viscous 1.6 SG mud to the well.
11:00	Monitored stable pressures. Opened annular preventer. No flow was observed. Unseated the packer while pumping 1.6 SG mud at 500 lpm. Pumped 5 m3 mud.
11:30	Started pulling 6 5/8" drillpipe and packer out of the hole. Lost mud to the hole at a rate of 1.2 m3 per hour.
12:00	Filled trip tank with seawater while monitoring static well.
13:30	Continued pulling drill pipe and packer out of the hole.
16:30	Made up 13 3/8" cement retainer and ran in hole on 5" drill pipe to 560 m.
17:30	Displaced 6 m3 viscous 1.8 SG mud inside the drillstring to cement retainer depth. Set the cement retainer at 560 m.
18:00	Pumped 34 m3 high viscous/high density through lower perforations at 565 m.
19:30	Pulled out of the hole with the retainer running assembly.
21:30	Made up 13 3/8" cement retainer and ran in hole on 5" drillpipe to 545 m.
23:00	Set the 13 3/8" cement retainer at 545 m. Set down 15 ton weight on retainer.
23:59	Pumped 50 m3, 1.6 SG mud to below the cement retainer at 545 m and through the perforations at 549.5 m.

Daily report no : 24 **Date:** 1998-07-31

Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
00:30	Monitored the wellhead for flow after displacing 1.6 SG mud to the well.
03:00	Deployed Mercur Subsea sand clearing equipment on seabed beside the BOP.
14:00	Troubleshoot an electrical fault on the electric motor for the water pump for the Mercur Subsea sand clearing equipment.
21:30	Cleared and dredged sand from below and around the BOP with Mercur subsea sand clearing equipment.
23:30	Inspected the area below and around the BOP with ROV.
23:59	Restarted clearing and dredging with subsea sand clearing equipment.

Daily report no : 25 **Date:** 1998-08-01

Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
00:30	Continued clearing and dredging sand from below and around the BOP.
01:30	Pumped 50 m3, 1.6 SG mud to the well down the drillstring and through perforations below the cement retainer at 545 m.
04:30	Pumped cement to the well. Pumped 2 m3 dyed 1.6 SG mud, 100 m3 1.9 SG lead and 15 m3 1.9 SG tail slurry, followed by 7 m3 1.15 SG mud. Observed shut in pressure (Zero!) until cement sets. ROV monitored for flow at the seabed.
10:00	Waited on cement. The ROV observed and monitored for flow at the seabed.
12:30	Observed the well flowing at seabed. Attempted to establish SIDPP. No pressure build up after intermittently pumping 5.9 m3, 1.6 SG mud. SIDPP = 1.4 bar, SICP = 1.9 bar. Lost wrench for string kelly cock down hole.
20:00	Commenced pumping 1.6 SG mud to the well at varying rates. Continuously monitored returns out of the well. Was unable to verify if returns at seabed were mud pumped to the hole. 134.3 m3 mud was pumped to the well.
21:00	Monitored SIDPP and SICP pressures. No changes was seen.
23:30	Recommenced pumping 1.6 SG mud to the well at varying rates. Continuously monitored returns out of the well. Was unable to verify if returns at the seabed were mud pumped to the hole.
23:59	Pumped 12 m3 dyed high viscous 1.6 SG mud to the well and displaced to outside of perforations at 550 m with 1.6 SG mud. Stopped pumping and observed pressures.

Daily report no : 26 **Date:** 1998-08-02

Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
03:00	Observed flow at the wellhead with ROV. Monitored SIDPP and SICP pressures.
04:00	The flow at the wellhead at seabed appeared to stop. Investigated with ROV. Confirmed that the well was still flowing.
05:00	Continued observation of the wellhead with ROV. Continued recording SIDPP and SICP pressures.
08:30	Pumped 20 m3 1.6 SG mud to the well to confirm circulation. Pumped 5 m3 high viscous dyed 1.6 SG mud as marker. Continued to observe the well.
09:00	Pumped 10 m3 1.6 SG mud to the well to confirm circulation. Pump 4 m3 high viscous dyed 1.6 SG mud as marker.
11:00	Pumped 65 m3, 1.9 SG lead followed by 15 m3 1.9 SG tail cement. Displaced cement with 2 m3 1.15 SG mud followed by 4 m3 seawater. Shut in and observed back pressure = 10 bar.
22:00	Waited on cement. Held back pressure on drillpipe. Noted the pressure dropped over time from 10 bar to 1.4 bar.
22:30	Stung out of the cement retainer.
23:30	Displaced the well to 1.15 SG mud by pumping 121 m3 mud into the well above the cement retainer at 545 m.
23:59	Shut down displacement and restabbed the stinger into the cement retainer. Flow-checked the well above the retainer, the well was static.

DAILY REPORT ON WELL 35/9-4 SX

Daily report no : 27 **Date:** 1998-08-03
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
01:00	Monitored the well on trip tank. Observed static conditins. Stung into the cement retainer set at 545 m.
01:30	Stung out of the cement retainer. Picked the stringer up 2 m and monitored the well to be static.
03:30	Pulled out of the hole. No undue overpull was experienced as the assembly was pulled out of the hole.
04:00	Rigged up Schlumberger wireline equipment.
08:00	Logged with Schlumberger. Ran # 1, TDT tool string. Logged with FAR detector at five stations; 535 m = 0 ft/ minute, 500 m = 3.3 ft/min, 480 m = 6.2 ft/min, 460 m = 6.7 ft/min, 430 m = 7.3 ft/min. Got no reading from the GR detector.
10:00	Ran logrun # 2; CBL/VDL/TEMP log tool string. Free pipe recorded on CBL log.
23:59	Observed that the well was stable. Monitored well on trip tank. Cleaned mud pits and prepared to mix new mud.

Daily report no : 28 **Date:** 1998-08-04
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 2,05 sg

Stop time	Description
18:30	Monitored the well on trip tank, it was stable. Cleaned mud pits and mixed new 2.0 SG mud.
19:00	Rigged up Schlumberger wireline.
21:00	Ran Schlumberger temperature log from 380 m to 535 m.
22:00	Prepared logging tools for a perforation run. Held safety briefing on the rig floor.
23:00	Ran Schlumberger 3 3/8" perforation gun. Perforated the 13 3/8" casing between 535 m and 533 m. Pulled out of the hole. (Observed with the ROV at the wellhead.)
23:59	Made up and ran a new Schlumberger 3 3/8" perforation gun. Perforated the 13 3/8" casing between 522 m and 520 m. The well appeared to stop flowing at the seabed after the perforation gun had been fired. Pulled out of the hole.

Daily report no : 29 **Date:** 1998-08-05
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 2,05 sg

Stop time	Description
00:30	Pulled out of the hole with the perforating gun. Rigged down Schlumberger equipment.
05:00	Made up and ran a Weatherford 12.25" taper mill assembly to 540 m to guage the hole across the perforations. Pulled out of the hole.
08:00	Made up a BJ 13 3/8" type 1223 MSR packer and ran in hole on 6 5/8" drill pipe to 520 m.
10:30	Observed and monitored that the well was stable. Commenced the seabed disposal operations.
11:00	Set the packer at 527 m.Set down 20 ton weight on the packer. Opened the chokeline and closed the annular preventer.
12:00	Made final checks and performed an injection test with 1.63 SG mud at variable pump rates. Pumped total 9 m3. Had minimal returns at seabed.
13:00	Pumped 21.5 m3 2.05 SG mud. Monitored the well and seabed. Chased with 8.5 m3 1.63 SG mud.
18:30	Observed and monitored the well. The ROV observed the seabed. The well flowed at first, but stopped after 4 hours.
20:30	Bleed off 7.9 bar on the chokeline, opened the annular preventer. Released the packer and pulled out of the hole.
22:30	Made up a 13 3/8" cement retainer and ran in the hole on 5 " drill pipe to 510 m.
23:00	Set the 13 3/8" retainer at 510 m. Pulled clear off the plug and attemted to circulate down the string without success.
23:30	Traced the stand pipe to be plugged. Unplugged the drillpipe and circulated 5180 l of 1.63 SG mud.
23:59	Stabbed into the retainer with 10 ton on the same and attemted to pump 5 m3 1.63 SG mud. The pump pressure increased to 100 bar after having pumped 737 l.

Daily report no : 30 **Date:** 1998-08-06
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
00:30	Pulled out of the cement retainer and pumped 1100 l of 1.63 SG mud.
01:00	Stung back into the packer and set down 15 ton. Established an injection rate of 614 lpm, with a maximum pump pressure of 53 bar. Pumped 5 m3 1.63 SG mud.
01:30	Pressure tested the cement hose to 200 bar / 5 min. Pumped 2 m3 drill water 6.6 m3 1.9 SG cement slurry and displaced with 5 m3 drill water.
02:30	Pulled out of the cement retainer and displaced the well to seawater.
03:30	Pulled out of the hole and laid down the cement retainer setting tool/stinger.
05:00	Made up the 3 1/2" drillpipe stinger joint to 5" drill pipe and ran in the hole and tagged the cement retainer at 510 m.
05:30	Set a ballanced cement plug from 510 m to 440 m. Pumped 6.6 m3 1.9 SG cement slurry.
06:30	Pulled out of the hole with the cement stinger to 440 m. Reverse circulated out excess cement and flushed kill and choke lines with seawater.
08:00	Continued pulling out of the hole.
14:00	Laid down 90 joints of 5" drill pipe in singles from the derrick.
16:30	Laid down 27 joints of 5" heavy wall drillpipe from the derrick.

DAILY REPORT ON WELL 35/9-4 SX

Daily report no : 30 **Date:** 1998-08-06
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
18:00	Laid down 30 joints of 6 5/8" drillpipe from the derrick.
18:30	Ran in the hole with 12 1/4" clean out bottom hole assembly.
19:30	Ran in the hole with 5" drillpipe and tagged the cement at 438 m with 10 tons.
21:00	Dressed off cement from 438 m to 460 m.
22:00	Circulated the hole clean.
23:00	Pressure tested the cement plug from 460 m to 510 m to 79 bar, OK.
23:59	Pulled out of the hole with 12 1/4" bottom hole assembly.

Daily report no : 31 **Date:** 1998-08-07
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
00:30	Installed the diverter bag and rigged up Schlumberger wireline.
03:00	Made up 3 3/8" perforating gun, held safety briefing on the rig floor. Ran in with the perforation guns and perforated from 453 m to 455 m. Pulled out with the perforation guns and rigged down the wireline equipment.
06:00	Made up 13 3/8" cement retainer. Ran in hole and set the packer at 445 m. Stung out and displaced the drillpipe to 1.63 SG mud while keeping 30 bar backpressure on the annulus. Re-stung in to the retainer. Established injection rate.
07:00	Pumped 1.0 m3 seawater and pressure tested the cement hose to 150 bar. Mixed and pumped 40 m3 1.90 SG cement slurry and displaced the same with 4.4 m3 seawater.
09:00	Pulled out of the cement retainer and circulated bottoms up. Flushed kill, choke and booster lines. The ROV observed that the well stop flowing at seabed at 08:30 hours.
10:00	Pulled out of the hole and laid down the cement retainer setting tool/stinger.
12:30	Laid down 45 joints 6 5/8" drill pipe from the derrick.
13:30	Laid down the 8" jar from the derrick and replaced it with a 8" drill collar.
23:59	Recovered Sub Sea Mercur unit to surface, serviced the topdrive and performed rig maintenance while waiting on the cement.

Daily report no : 32 **Date:** 1998-08-08
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
01:00	Rigged up Schlumberger while waiting on the cement.
03:00	Ran CBL/VDL/TEMP-log to 441m.
03:30	Pressure tested the retainer at 445 m to 76 bar.
06:00	Perforated the 13 3/8" casing from 436 m to 438 m. No loss was obseved on the trip tank.
06:30	Closed the shear ram and established injection using seawater. Opened shear ram and monitored the well, had no losses.
09:00	Made up 13 3/8" cement retainer and ran in and set the same at 429 m. Pulled out of the retainer.
10:30	Held pre job meeting, pressure tested the cement line to 150 bar. Pressure tested the cement retainer at 429 m to 76 bar, OK. Filled the string with 1.63 sg mud. Stung into the retainer and established injection rate.
11:30	Mixed and pumped 24 m3 1.9 SG cement slurry and dislaced the same with 4.4 m3 seawater. ROV observed returns at seabed during 3/4 of the cement job. Returns then stopped and after that no flow was seen at the seabed.
13:30	Pulled out of the retainer and reverse ciculated 9.2 m3. Opened the annular preventer and circulated 75.2 m3 seawater the long way. No flow was observed by the ROV at seabed.
14:30	Pulled out of the hole and laid down the cement retainer setting tool/stinger. No flow was seen at seabed by the ROV.
23:59	Waited on the cement to set up. Performed general rig maintenance. No flow was observed at seabed by ROV.

Daily report no : 33 **Date:** 1998-08-09
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
00:30	Made up 3 1/2" drillpipe stinger to 5" drillpipe and ran in the hole. Tagged the cement retainer at 429 m.
01:00	Pressure tested the cement hose to 100 bar/ 5 min. Mixed and pumped 2 m3 1.90 SG cement slurry and displaced same with 3.9 m3 seawater, giving a plug from 429 m to 404 m.
02:00	Pulled out of the hole to 404 m and reverse circulated out excess cement. Circulated bottoms up conventionally.
02:30	Pulled out of the hole with the cement stinger and laid down the same.
04:00	Made up jet sub and ran in hole and washed the BOP and wellhead area. Pulled out of the hole and laid down the jet sub.
06:00	Made up wear-bushing retrieving tool and ran in hole. Engaged into the 13 3/8" extended wear-bushing and pulled the same free with 25 ton overpull. Pulled out of the hole and laid down wear-bushing and retrieving tool.
06:30	Cleared the drill floor. Held pre job safety meeting.
08:30	Rigged up to pull the riser and BOP.
09:30	Pulled the diverter and laid down the same. Held pre job safety meeting with the crew.

DAILY REPORT ON WELL 35/9-4 SX

Daily report no : 33 **Date:** 1998-08-09
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
11:00	Picked up landing joint and made it up to the innerbarrel. Collapsed the slip joint . Made a final checks and unlatched the BOP at 11:00 hrs.
12:00	Undressed the MUX saddles and the Rucker lines.
23:59	Removed the goosenecks and gimbal ring from the slip joint, pulled and laid down the slip joint. Continued pulling the marine riser and BOP.

Daily report no : 34 **Date:** 1998-08-10
Midnight depth : 1261 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
01:00	Continued pulling the riser and BOP.
02:00	Removed the guidelines and secured the acoustic arms.
04:00	Secured the BOP on the transporter, removed the MUX cables, nippled down the double riser joints. Laid down the double riser joint plus a riser pup joint, while parking the BOP.
06:00	Rigged down the riser handling equipment. Cleared the drillfloor. Nippled up the torque wrench and changed the bails.
08:00	Picked up and made up the 20"/30" cutting assembly (MOST-tool) and tested same.
10:00	Ran in with the cutting assembly and positioned the rig over the wellhead.
11:00	Continued positioning the rig and stabbed the cutting assembly in at 10:55 hrs.
12:30	Cut the 20"/30" casing at 392.5 m.
14:30	Latched the MOST tool to the 18 3/4" wellhead and pulled the 20"/30" housing / RGB free with 20 ton overpull. Pulled the same to surface and secured it on the trolly.
16:00	Released and laid out the MOST tool. The ROV completed the seabed survey.
17:30	Made up the 18 3/4" wellhead housing running tool. Engaged the running tool and released the 20"/30" housing from the guide base. Laid down the same.
18:30	Laid down two cement stands from the derrick. Removed the guide posts from the guide base.
23:59	Waited on supply boat with 20" and 30" casing onboard before start deballasting the rig.

Daily report no : 35 **Date:** 1998-08-11
Midnight depth : 0 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,60 sg

Stop time	Description
01:30	Waited on supply boat.
14:30	Offloaded and backloaded the boats.
20:30	Commenced de-ballasting the rig to transit draft at 14:15 hrs. Continued backloading from the rig.
23:59	Performed anchor handling.

Daily report no : 36 **Date:** 1998-08-12
Midnight depth : 0 m MD **Estimated PP:** sg **Mud weight:** 1,60 sg

Stop time	Description
09:30	Performed anchor handling. All anchors were bolstered at 08:45 hrs. Commenced tight tow at 09:30 hrs to well 6305/1-1 (Ormen Lange).

TIME DISTRIBUTION

Well: 35/9-4 SX **PO:** 1 **Start date:** 1980-01-01 **Stop date:** 1999-02-02 **Rig:** TRANSOCEAN LEADER **Depth:** 1261,0 m MD

Main Operation: All

Section: 36"

Operations	Hours	%	Hours	%	Acc. total
DRILLING					
BHA HANDLING/TESTING	1,0	0,12			
TRIPPING IN OPEN HOLE	1,0	0,12			
DRILLING	10,0	1,20			
CIRC. AND COND. MUD/HOLE	0,5	0,06			
WIPER TRIP	1,0	0,12			
CASING HANDLING/TESTING	5,0	0,60			
PRIMARY CEMENTING	11,0	1,32			
Sum			29,5	3,53	29,5
DOWNTIME DRILLING					
EQUIPMENT FAILURE AND REPAIR	0,5	0,06			
CEMENTING	4,0	0,48			
OTHER	1,0	0,12			
WIPER TRIP	4,5	0,54			
Sum			10,0	1,20	39,5

Section: 17,5

Operations	Hours	%	Hours	%	Acc. total
DRILLING					
BHA HANDLING/TESTING	4,0	0,48			
TRIPPING IN CASED HOLE	6,0	0,72			
TRIPPING IN OPEN HOLE	2,0	0,24			
DRILLING	29,5	3,53			
OTHER	1,5	0,18			
CIRC. AND COND. MUD/HOLE	3,5	0,42			
WIPER TRIP	8,5	1,02			
CASING HANDLING/TESTING	20,5	2,45			
DRILLING OUT OF CASING	6,0	0,72			
PRIMARY CEMENTING	8,0	0,96			
BOP RUNNING/RETRIEVING	36,5	4,37			
Sum			126,0	15,08	165,5
FORMATION EVALUATION MWD					
BHA HANDLING/TESTING	1,0	0,12			
Sum			1,0	0,12	166,5
DOWNTIME DRILLING					
EQUIPMENT FAILURE AND REPAIR	12,5	1,50			
WAITING	2,0	0,24			
WELL CONTROL	467,0	55,89			
Sum			481,5	57,63	648,0

Section: 0.0

Operations	Hours	%	Hours	%	Acc. total
MOBILIZATION					
MOVING	80,5	9,63			
MOORING; RUNNING ANCHORS	25,5	3,05			
MOORING; PULLING ANCHORS	19,0	2,27			
Sum			125,0	14,96	773,0
PLUG AND ABANDONMENT					
OTHER	0,5	0,06			
CIRC. AND COND. MUD/HOLE	1,0	0,12			
TRIPPING FOR CEMENT JOB	1,0	0,12			
BOP HANDLING	10,5	1,26			
BOP RUNNING/RETRIEVING	16,5	1,97			

TIME DISTRIBUTION

Well: 35/9-4 SX **PO:** 1 **Start date:** 1980-01-01 **Stop date:** 1999-02-02 **Rig:** TRANSOCEAN LEADER **Depth:** 1261,0 m MD

Main Operation: All

Section: 0.0

Operations	Hours	%	Hours	%	Acc. total
PLUG AND ABANDONMENT					
WELLHEAD EQUIPMENT HANDLING	2,5	0,30			
SET CEMENT PLUG	0,5	0,06			
TRIPPING OF CASING CUTTING EQUIPMENT	8,5	1,02			
CUT CASING/WELLHEAD	1,5	0,18			
Sum			42,5	5,09	815,5
DOWNTIME MOBILIZATION					
WAITING	20,0	2,39			
Sum			20,0	2,39	835,5
Reported time (100,0 % of well total 835,5 hours) :					835,5

Downtimereport 35/9-4 SX

99-02-02

Well	Rep	#	Hrs	Date	Downtime Type	Short Description	Responsible Contractor	Nsfi Type	Equipment Type	Service Type
35/9-4 SX	1.		0.5	1998-07-12	Equipment fail	Rectified fault on the MWD tool surface equipment.	BAKER HUG	Mud Logging	SERVICE EQUIPME	MWD/LWD
	2.		4.5	1998-07-13	Other	Reamed repeatetly to bring the hole angle below 1.5 deg	NORSK HYD			
	3.		1.0	1998-07-13	Other	Worked the string and anchors to reduce the bulls eyes on the permanent guide ba	NORSK HYD			
	4.		4.0	1998-07-14	Other	Pulled 3 1/2" stinger out of 30", ROV assisted stab into PGB funnels - tagged ce	NORSK HYD			
	7.		478.0	1998-07-18	Kick	Start flow SW after pump primary cement. Water flow from 550-600m and 875-985m.	NORSK HYD			
	5.		1.5	1998-07-19	Equipment fail	Damage found on marine riser conduit line nipple joint, replaced nipple.	TRANSOCEA	Riser System (incl.	WELLCONTROL EQ	SUB-SEA EQ
	7.	1	2.0	1998-07-24	Waiting for ma	Waited on Schlumberger logging tool. Monitor static well.	NORSK HYD	TDT-logging equip	SERVICE EQUIPME	ELECTRIC LO
	9.		20.0	1998-08-10	Waiting for ma	Waited on supply boat with 20" and 30" caising onboard before start deballasting	NORSK HYD			
			511.5							

Norsk Hydro 1999-02-02

HOLE DEVIATION

Well: 35/9-4 SX **Reference point:** RKB ; 24,0 m ABOVE MSL
Waterdepth: 363,0 m **Vertical to:** 386,9 m
Utm zone: 31 **Central Median:** 3° E **Horizontal datum:** ED50
Template Centre Coordinates, UTM: **North :** m, **East:** m
Wellhead Coordinates, UTM: **North :** 6799609,40 m, **East:** 551677,20 m
Official Surveys: Y **Track :**
Coordinates are measured from the wellhead centre.

Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
387,0	0,00	0,00	MWD		387,0	0,00	0,00	0,0	0,00	0,00	0,00
397,0	0,40	320,30	MWD		397,0	0,03	-0,02	0,0	1,20	1,20	-119,10
406,0	0,70	335,60	MWD		406,0	0,10	-0,07	0,1	1,10	1,00	51,00
416,0	1,30	6,30	MWD		416,0	0,27	-0,08	0,3	2,35	1,80	92,10
424,0	0,70	17,70	MWD		424,0	0,41	-0,05	0,4	2,36	-2,25	42,75
438,0	1,40	26,40	MWD		438,0	0,64	0,05	0,6	1,53	1,50	18,64
479,0	1,80	27,90	MWD		479,0	1,66	0,57	1,8	0,29	0,29	1,10
508,0	1,30	17,90	MWD		508,0	2,37	0,89	2,5	0,59	-0,52	-10,34
538,0	1,20	18,80	MWD		538,0	3,00	1,09	3,2	0,10	-0,10	0,90
567,0	1,20	51,40	MWD		567,0	3,47	1,43	3,8	0,70	0,00	33,72
597,0	1,00	37,90	MWD		596,9	3,87	1,83	4,3	0,33	-0,20	-13,50
687,0	1,10	32,40	MWD		686,9	5,22	2,78	5,9	0,05	0,03	-1,83
774,0	1,00	17,50	MWD		773,9	6,65	3,46	7,5	0,10	-0,03	-5,14
862,0	0,70	30,90	MWD		861,9	7,85	3,96	8,8	0,12	-0,10	4,57
952,0	1,20	349,60	MWD		951,9	9,25	4,07	10,1	0,27	0,17	-13,77
1041,0	0,70	314,30	MWD		1040,9	10,54	3,52	11,1	0,25	-0,17	-11,90
1130,0	0,20	45,70	MWD		1129,9	11,03	3,24	11,5	0,25	-0,17	30,81
1218,0	0,50	308,30	MWD		1217,9	11,38	3,05	11,8	0,19	0,10	-33,20
1246,0	0,40	327,00	MWD		1245,9	11,53	2,90	11,9	0,19	-0,11	20,04

Norsk Hydro

1999-02-02

MAIN CONSUMPTION OF CASING/TUBING ON WELL 35/9-4 SX

Size	Casing string	Grade	Weight [kg/m]	Weight [lb/ft]	Threads type	Length [m]	No. of joints
30"	CONDUCTOR	X-52	677,98	455,60	QUICK THREAD	63,0	5
13 3/8"	SURFACE	N-80	107,14	72,00	BUTTRESS	870,2	73

CEMENT CONSUMPTION PER JOB ON WELL 35/9-4 SX

Date	CsgSize	Job Type	Cement/ Additive	Description	Unit	Actual Amount Used
1998-07-13	30"	CASING CEMENTING	A-7L	ACCELERATOR: LIQUID CACL2	I	2307
			FP-9L	SPECIAL ADDITIVE: DEFOAMER	I	130
			G	API CLASS G	MT	70
1998-07-14	30"	GROUT	A-7L	ACCELERATOR: LIQUID CACL2	I	2307
			FP-9L	SPECIAL ADDITIVE: DEFOAMER	I	130
			G	API CLASS G	MT	69
1998-07-27	13 3/8"	CASING CEMENTING	CD-31L	DISPERSANT: CD-31L LIQUID	I	95
			FP-9L	SPECIAL ADDITIVE: DEFOAMER	I	20
			G	API CLASS G	MT	15
			R-12L	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 [	I	36
1998-08-01	13 3/8"	SQUEEZE	A-7L	ACCELERATOR: LIQUID CACL2	I	3550
			FLUORE	FLUORECEIN	I	20
			FL45LN	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEC	I	1455
			CD31LN	DISPERSANT: CD-31LN LIQUID	I	194
			FP-9L	SPECIAL ADDITIVE: DEFOAMER	I	209
			MICRO	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGF	I	2100
			G	API CLASS G	MT	177
1998-08-02	13 3/8"	SQUEEZE	A-7L	ACCELERATOR: LIQUID CACL2	I	2852
			CD-31L	DISPERSANT: CD-31L LIQUID	I	250
			FP-9L	SPECIAL ADDITIVE: DEFOAMER	I	304
			FLUORE	FLUORECEIN	I	38
			FL45LN	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEC	I	1665
			G	API CLASS G	MT	97
			MICRO	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGF	I	2420
1998-08-06	13 3/8"	SQUEEZE	A-7L	ACCELERATOR: LIQUID CACL2	I	240
			FP-9L	SPECIAL ADDITIVE: DEFOAMER	I	20
			G	API CLASS G	MT	11
1998-08-06	13 3/8"	PLUG IN CASED HOLE	A-7L	ACCELERATOR: LIQUID CACL2	I	240
			FP-9L	SPECIAL ADDITIVE: DEFOAMER	I	20
			G	API CLASS G	MT	11
1998-08-07	13 3/8"	SQUEEZE	A-7L	ACCELERATOR: LIQUID CACL2	I	1924
			FP-9L	SPECIAL ADDITIVE: DEFOAMER	I	110
			G	API CLASS G	MT	51
1998-08-08	13 3/8"	SQUEEZE	A-7L	ACCELERATOR: LIQUID CACL2	I	1508
			FP-9L	SPECIAL ADDITIVE: DEFOAMER	I	70
			G	API CLASS G	MT	36
1998-08-09	13 3/8"	PLUG IN CASED HOLE	A-7L	ACCELERATOR: LIQUID CACL2	I	148
			FP-9L	SPECIAL ADDITIVE: DEFOAMER	I	5
			G	API CLASS G	MT	3

BITRECORD FOR WELL 35/9-4 SX

Bit No	Bit RR	Bit Type	Size (in)	Manu-fact-urer	Trade name	Serial no.	IADC code	Nozzles diameter (../32in)	Flow area (in2)	BHA no.	Depth out (m MD)	Bit meter (m)	Rot. hours (hrs)	ROP (m/hr)	Rotation min/max) (rpm)	Total bit revol.	Weight min/max (kN)	Flow min/max (l/min)	Pump min/max (bar)	Cutting Structure I - O -DC- L - B	Gauge 1/16 (in)	Other Remarks	Pull Cause
1	1	ISRT	17,50	HTC	MAX-GT09D	A13dr	435	14,16,28,28	1,549	1	451	63	7,50	8,4	80/110	30000	0/50	2050/4450	90/190				
1	1	HO	36,00	GRNT	MODIFIED	rb15436		12,12,12,12,12,12	1,325	1	451	63	7,50	8,4	80/110	30000	0/50	2050/4450	90/190				
2	1	MITO	26,00	HTC	CR1	R01R4992	111	32,32,32,32	3,142	2	451	7	1,10	6,4	65/80	4750	0/15						
3		MITO	17,50	SMIT	MSDGHODQC	lk0181	135	15,16,24,24	1,252	3	1261	810	18,80	43,1	36/160	191146	0/22	3400/4800	135/250	1 - 1 - NO - A - E	1	NO	TD
4	1	ISRT	12,25	SMIT	10M	LK 1080	435	32,32,32,32	3,142	4	1110	563		0,0									

BOTTOM HOLE ASSEMBLIES USED ON WELL 35/9-4 SX

BHA no. 1: No. / Element / OD(in) / Length(m) Depth In: 388 m MD Out: 451 m MD

1	MAX-GT09D	17,5	0,40	2	MODIFIED	36,0	2,63
3	BIT SUB	9,5	1,21	4	X-OVER	8,25	1,00
5	MWD	8,25	16,13	6	SAVER SUB	8,25	0,40
7	DRILL COLLAR STEEL	8,25	55,14	8	JAR	8,0	9,70
9	DRILL COLLAR STEEL	8,25	27,78	10	X-OVER	6,5	1,11
11	HWDP	5,0	264,10				

Reason pulled: Sum: 379,60

BHA no. 2: No. / Element / OD(in) / Length(m) Depth In: 444 m MD Out: 451 m MD

1	CR1	26,0	0,69	2	BIT SUB	9,0	1,21
3	DRILL COLLAR STEEL	8,25	55,14	4	JAR	8,0	9,70
5	DRILL COLLAR STEEL	8,25	27,74	6	X-OVER	6,5	1,11
7	HWDP	5,0	136,91				

Reason pulled: Sum: 232,50

BHA no. 3: No. / Element / OD(in) / Length(m) Depth In: 451 m MD Out: 1261 m MD

1	MSDGHODQC	17,5	0,46	2	BIT SUB	9,5	1,21
3	MWD	8,25	17,53	4	X-OVER	9,5	0,88
5	STEEL STAB	17,5	2,48	6	X-OVER	9,5	1,10
7	DRILL COLLAR STEEL	8,25	55,14	8	JAR	8,0	9,70
9	DRILL COLLAR STEEL	8,25	27,78	10	X-OVER	6,5	1,11
11	HWDP	5,0	136,91				

Reason pulled: TOTAL DEPTH/CASING DEPT Sum: 254,30

BHA no. 4: No. / Element / OD(in) / Length(m) Depth In: 547 m MD Out: 1110 m MD

1	10M	12,25	0,32	2	BIT SUB	8,0	0,91
3	OTHER	8,25	55,14	4	JAR	8,0	9,70
5	OTHER	8,25	18,48	6	X-OVER	6,5	1,11
7	OTHER	5,0	136,91				

Reason pulled: Sum: 222,57

DAILY MUD PROPERTIES:RHEOLOGY PARAMETERS FOR WELL 35/9-4 SX

Hole section : 36" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Funnel Visc [sec]	Dens [sg]	Mudtmp Out [DegC]	Fann Readings 600	300	200	100	60	30	6	3	Rheo Test [DegC]	PV [mPas]	YP [Pa]	Gel0 [Pa]	Gel10 [Pa]
1998-07-13	451	451			1,03						0	0							
1998-07-14	451	451	SEA WATER		1,03						0	0							

Hole section : 17 1/2" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Funnel Visc [sec]	Dens [sg]	Mudtmp Out [DegC]	Fann Readings 600	300	200	100	60	30	6	3	Rheo Test [DegC]	PV [mPas]	YP [Pa]	Gel0 [Pa]	Gel10 [Pa]
1998-07-15	1025	1025	SEA WATER		1,03						0	0							
1998-07-16	1261	1261	SEA WATER		1,03						0	0							
1998-07-20	580	580	BENTONITE MUD	60,0	1,61		65	43	35	25	0	0	13	12	50,0	22,0	10,1	7,5	18,0
1998-07-21 20:00	850	850	NaCl/POLYMER MU	64,0	1,65		64	46	34	26	0	0	10	8	50,0	18,0	13,4	4,0	8,0
1998-07-22 23:59	1261	1261	NaCl/POLYMER MU	47,0	1,20		32	22	18	14	0	0	4	3	20,0	10,0	5,7	2,0	3,0
1998-07-23 23:59	1261	1261	NaCl/POLYMER MU	47,0	1,20		32	22	18	14	0	0	4	3	20,0	10,0	5,7	2,0	3,0
1998-07-24 23:59	1261	1261	NaCl/POLYMER MU	65,0	1,60		64	46	36	26	0	0	10	8	50,0	18,0	13,4	5,0	8,0
1998-07-25 23:59	1261	1261	KCL/POLYMER	65,0	1,60		64	46	36	26	0	0	10	8	50,0	18,0	13,4	5,0	8,0
1998-07-26 23:59	1261	1261	KCL/POLYMER	65,0	1,60		64	46	36	26	0	0	10	8	50,0	18,0	13,4	5,0	8,0
1998-07-27 23:59	1261	1261	BENTONITE MUD	80,0	1,60		58	40	32	26	0	0	18	16	20,0	18,0	10,5	8,0	12,0
1998-07-28 23:59	1261	1261	BENTONITE MUD	80,0	1,60		58	40	32	26	0	0	18	16	50,0	18,0	10,5	8,0	12,0
1998-07-29 23:59	1261	1261	KCL/POLYMER	82,0	1,60		59	40	32	25	0	0	18	16	50,0	19,0	10,1	8,0	12,0
1998-07-30 23:59	1261	1261	NaCl/POLYMER MU	80,0	1,60		58	40	33	25	0	0	17	16	50,0	18,0	10,5	8,0	13,0
1998-07-31 23:59	1261	1261	NaCl/POLYMER MU	80,0	1,60		58	40	32	25	0	0	18	16	50,0	18,0	10,5	8,0	12,0
1998-08-01 23:59	1261	1261	NaCl/POLYMER MU	80,0	1,60						0	0			50,0	19,0	10,1	8,0	12,0
1998-08-02 23:59	1261	1261	NaCl/POLYMER MU	80,0	1,60		58	40	32	25	0	0	18	16	50,0	18,0	10,5	8,0	12,0
1998-08-04	1261	1261	BENTONITE MUD	150,0	2,05		92	76	71	65	0	0	55	43	20,0	16,0	28,7	48,0	50,0
1998-08-05	510	510	BENTONITE MUD	150,0	2,05		5192	76	71	65	0	0	55	43	20,0	16,0	28,7	48,0	50,0
1998-08-06	460	460	BENTONITE MUD	65,0	1,60		66	48	38	28	0	0	14	12	20,0	18,0	14,4	8,0	12,0
1998-08-07	452	452	BENTONITE MUD	65,0	1,60		66	48	38	28	0	0	14	12		18,0	14,4	8,0	10,0

DAILY MUD PROPERTIES : OTHER PARAMETERS FOR WELL 35/9-4 SX

Hole section : 36" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
1998-07-13	451	451		1,03					/																
1998-07-14	451	451	SEA WATER	1,03					/																

Hole section : 17 1/2" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
1998-07-15	1025	1025	SEA WATER	1,03					/																
1998-07-16	1261	1261	SEA WATER	1,03					/																
1998-07-20	580	580	BENTONITE MUD	1,61	25,0		2		/	9,1	0,5	0,1	1,3	15		27000	1200		1200	22,0		0,3			4
1998-07-21 20:00	850	850	NaCl/POLYMER M	1,65	16,0		1		/	8,5						19500									
1998-07-22 23:59	1261	1261	NaCl/POLYMER M	1,20	17,4		1		/	7,0						19500				7,0					
1998-07-23 23:59	1261	1261	NaCl/POLYMER M	1,20	17,4		1		/	70,0						19500				7,0					3
1998-07-24 23:59	1261	1261	NaCl/POLYMER M	1,60	6,3		1		/	8,0				143	72000	83000				22,0					1
1998-07-25 23:59	1261	1261	KCL/POLYMER	1,60	6,3		1		/	8,0				143	74	83000				22,0					
1998-07-26 23:59	1261	1261	KCL/POLYMER	1,60	6,3		1		/	8,0				143	74	83000				22,0					
1998-07-27 23:59	1261	1261	BENTONITE MUD	1,60	8,2		2		/	7,6										21,0			55		118
1998-07-28 23:59	1261	1261	BENTONITE MUD	1,60	8,2		2		/	7,6										21,0			55		118
1998-07-29 23:59	1261	1261	KCL/POLYMER	1,60	8,5		2		/	8,5													55		
1998-07-30 23:59	1261	1261	NaCl/POLYMER M	1,60	8,4		2		/	7,8										21,0			55		118
1998-07-31 23:59	1261	1261	NaCl/POLYMER M	1,60	8,5		2		/	7,8										21,0			55		118
1998-08-01 23:59	1261	1261	NaCl/POLYMER M	1,60	8,4		2		/	7,9										21,0			55		118
1998-08-02 23:59	1261	1261	NaCl/POLYMER M	1,60	8,4		2		/											21,0			55		118
1998-08-04	1261	1261	BENTONITE MUD	2,05					/	7,6										33,5					36
1998-08-05	510	510	BENTONITE MUD	2,05					/	7,6										33,5					
1998-08-06	460	460	BENTONITE MUD	1,60					/	7,8										20,0					
1998-08-07	452	452	BENTONITE MUD	1,60					/	7,8										20,0					

TOTAL CONSUMPTION OF MUD ADDITIVES ON WELL 35/9-4 SX

Section	Product/ Additive	Unit	Total Amount Used
36"	AQUAPAC LV	kg	850,00
	BARITE	kg	17000,00
	BENTONITE	kg	8000,00
	BICARBONATE	kg	2489,00
	BP DCP 208 (POLYALC. GLYCO)	kg	34,00
	CITRIC ACID	kg	54,00
	FLOWZAN	kg	199,00
	KCL	kg	9434,00
	LIME	kg	23,00
	SODA ASH	kg	29,00
	XANTHAN GUM	kg	14,00
17 1/2"	ANCO DEFOAMER	l	123,00
	ANTISOL FL10	kg	668,00
	ANTISOL FL30	kg	311,00
	AQUACOL D	kg	1394,00
	AQUACOL D/S	kg	4806,00
	AQUACOL S	kg	2157,00
	AQUAPAC LV	kg	7374,00
	AQUAPAC R	kg	175,00
	AQUAPAC ULV	kg	1099,00
	BARITE	kg	7993,04
	BENTONITE	kg	43595,00
	BICARBONATE	kg	84,00
	BP DCP 208 (POLYALC. GLYCO)	kg	16857,00
	BRINEWATE A	kg	6168,00
	CHECK-LOSS	kg	211,00
	CITRIC ACID	kg	278,00
	DEFOAM GREEN	kg	17,00
	FLOWZAN	kg	1021,00
	GLUTE 10	kg	150,00
	GLYDRIL MC	l	1752,00
	KCL	kg	87613,00
	KCL BRINE	l	33000,00
	KCL POWDER	kg	69111,00
	LAMPAC EXLO	kg	1804,00
	LIME	kg	737,00
	MG-O	kg	57,00
	MICA F/M/C	kg	43,00
	MICA FINE	kg	400,00
	MICA MEDIUM	kg	450,00
	NUTPLUG F/M/C	kg	40,00
	PERMALOSE HT	kg	3633,00
	RHODOPOL 23P	kg	1383,00
	SODA ASH	kg	2030,00
	SODIUM BICARBONATE	kg	542,00
	SODIUM CHLORIDE	kg	38906,00
	STAPLEX 500	kg	10164,00
	VENFYBER	kg	220,00
	XANTHAN GUM	kg	1041,00
	XC-POLYMER	kg	2135,00

All depths relative to RKB

RKB - MSL : 23.5 m

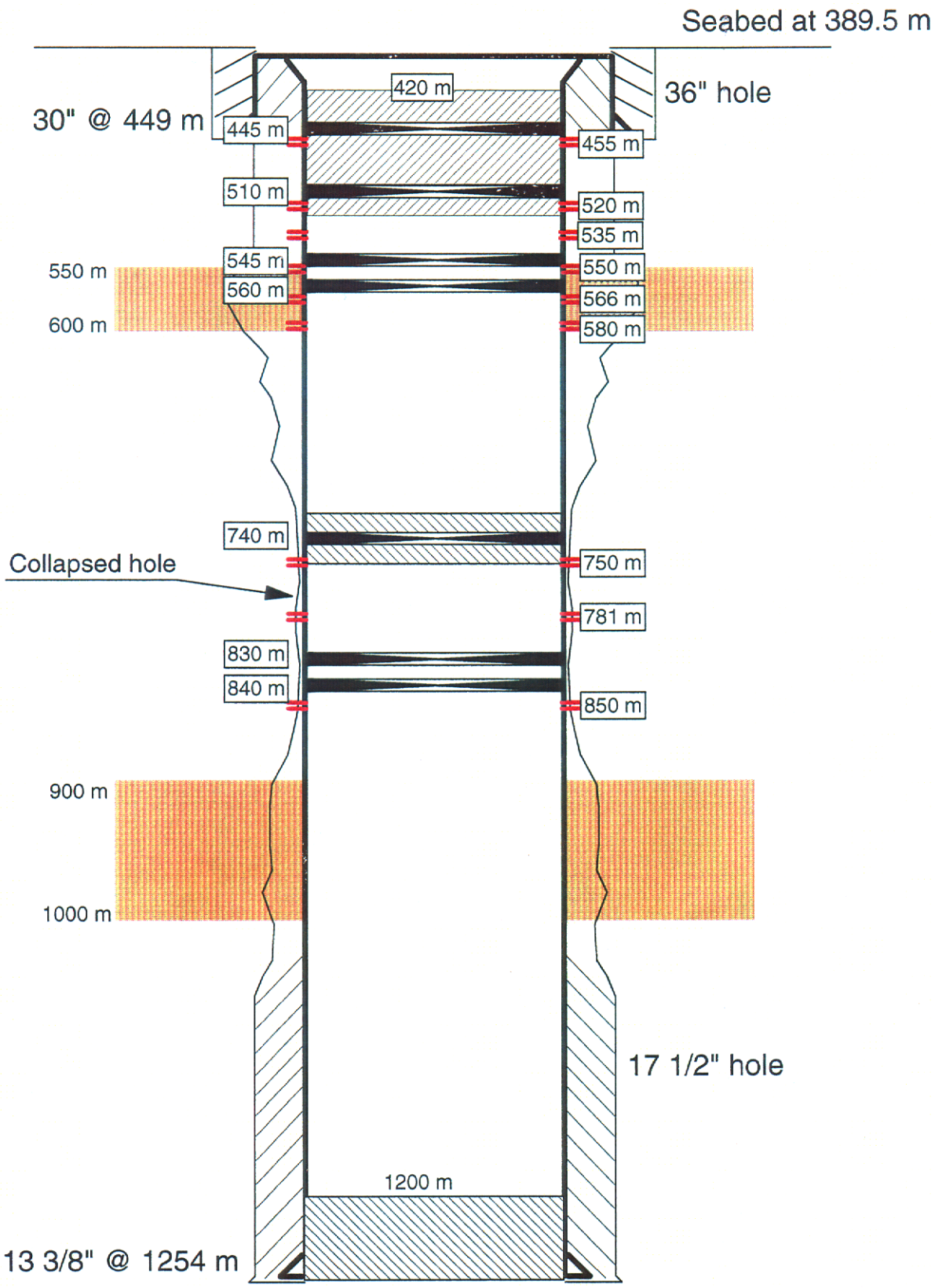


Figure B-1

35/9-4 SX

Permanent plug and abandonment

HYDRO

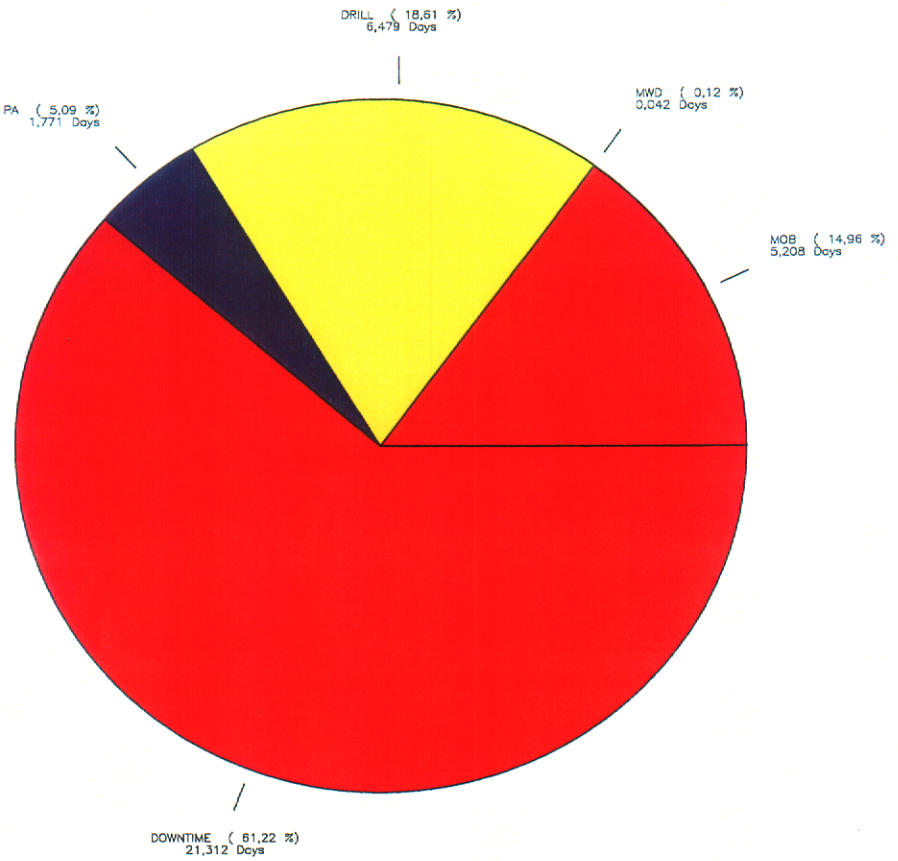
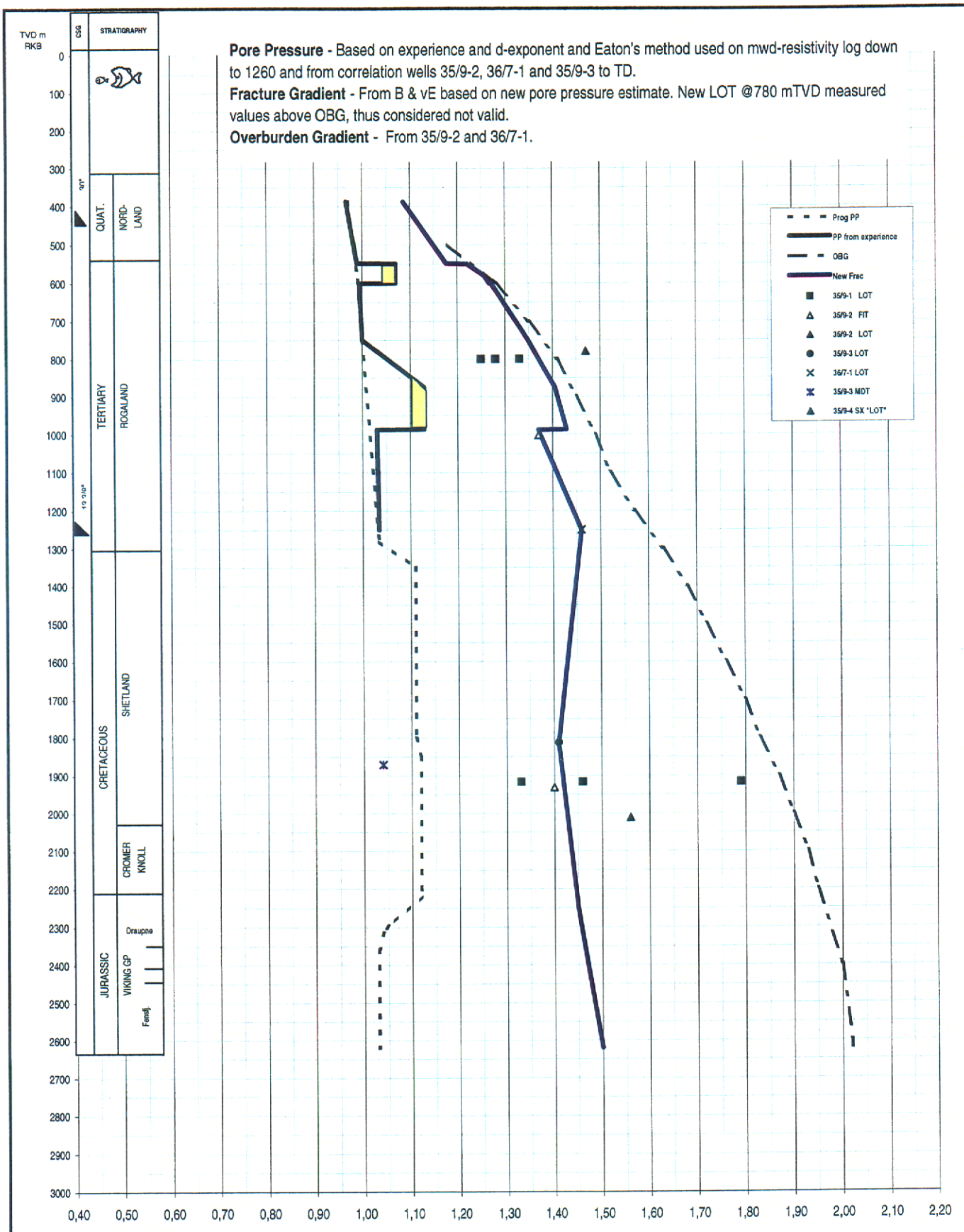
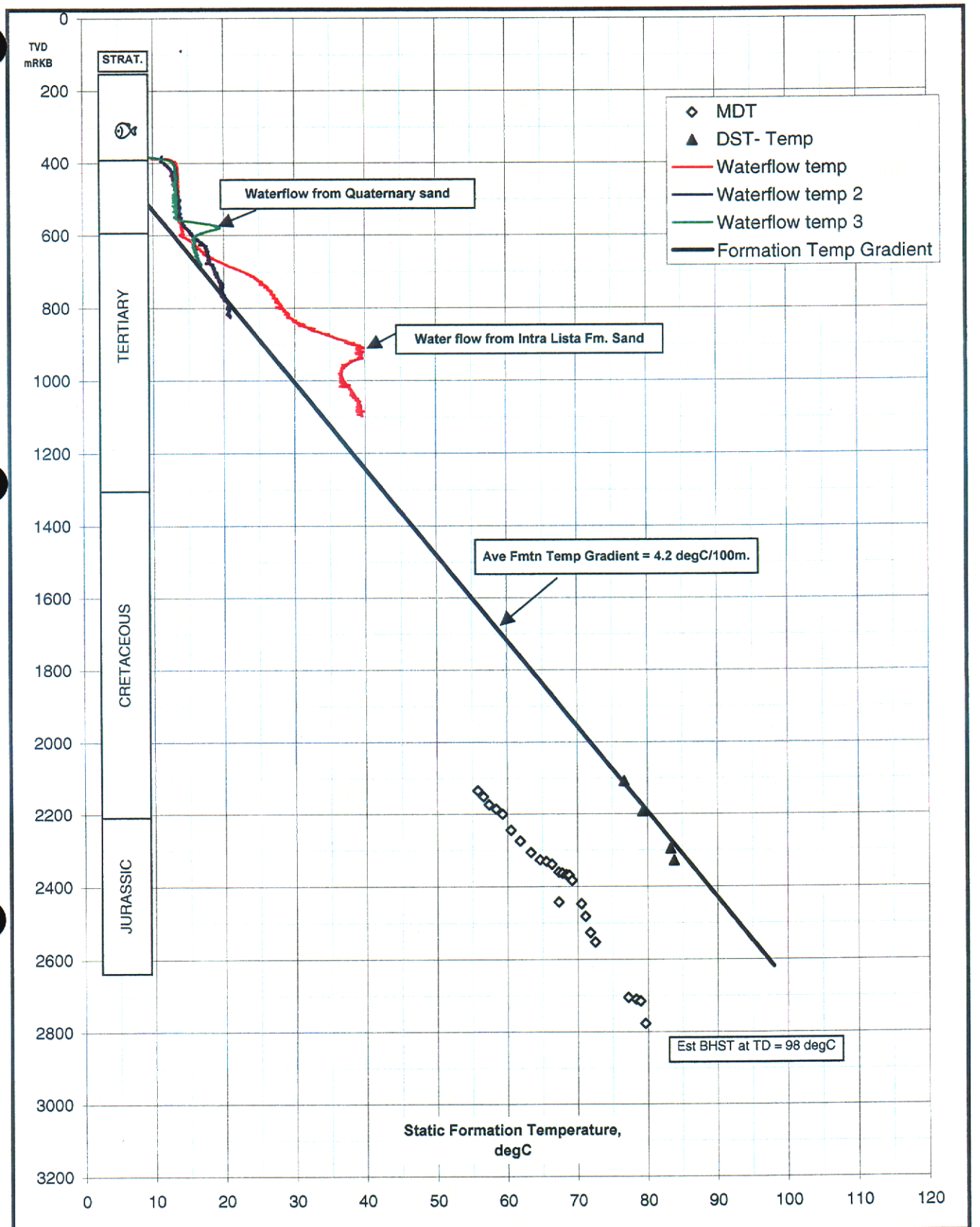


Fig. B - 2		Time Distribution 35/9-4 SX	**HYDRO**

Pore Pressure - Based on experience and d-exponent and Eaton's method used on mwd-resistivity log down to 1260 and from correlation wells 35/9-2, 36/7-1 and 35/9-3 to TD.
Fracture Gradient - From B & vE based on new pore pressure estimate. New LOT @780 mTVD measured values above OBG, thus considered not valid.
Overburden Gradient - From 35/9-2 and 36/7-1.



Final well Report 35/9-4 SX	Figure: 6.1 Revision: 2 Date: 19/8-98	**Revised pore pressure, fracture- and overburden gradient**	HYDRO



Final well Report 35/9-4 SX	Figure: 6. –2	**Revised Formation Temperature Gradient**

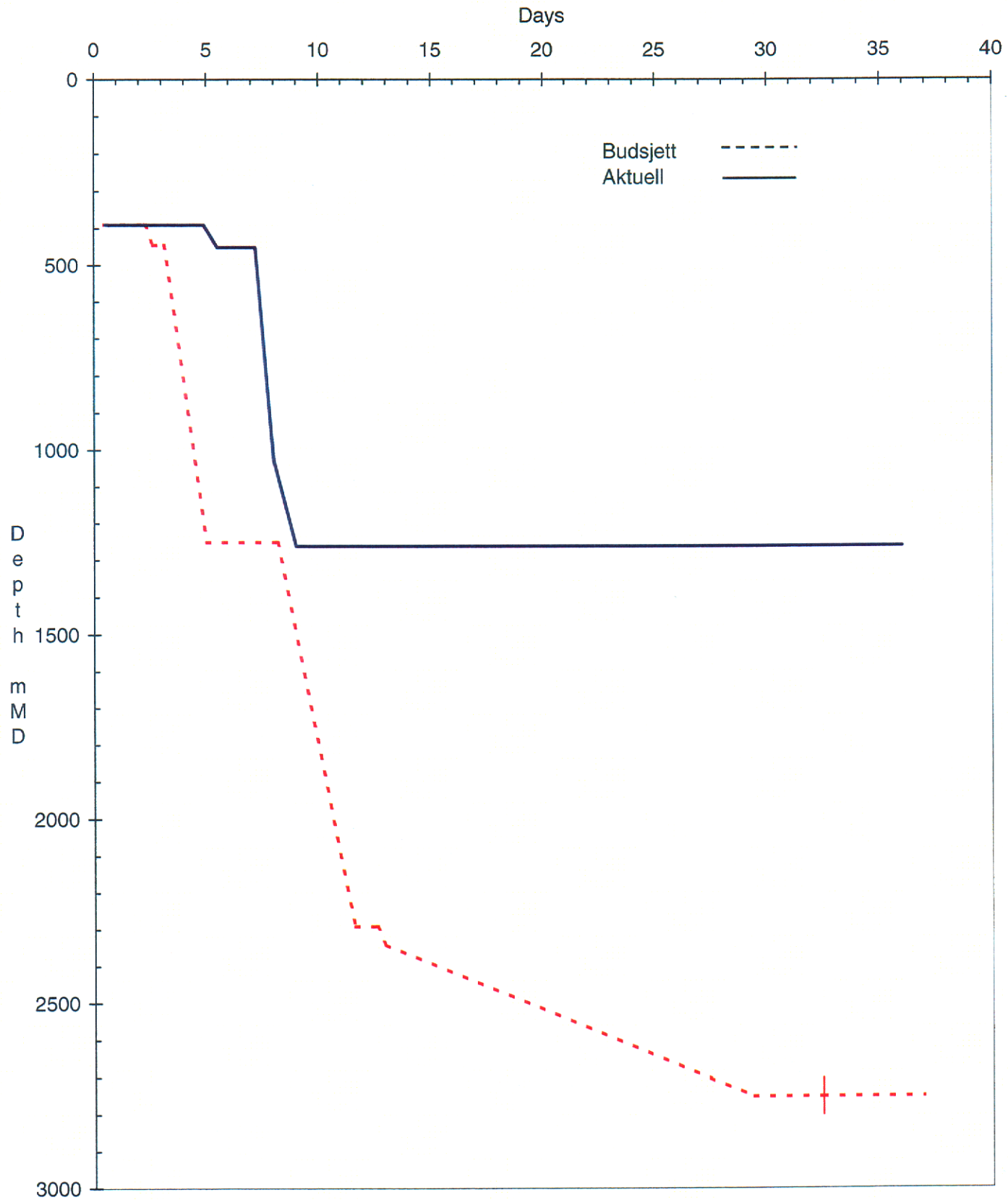


Fig. B-5

Drilling Curves
Well 35/9-4 SX

HYDRO

INTERPRETATION RESULTS

LEGEND:

Correlation of seismic event with log event (Seismic pick in site survey report)

Revised seismic pick (Based on log results)

DRILLING RESULTS

35/9-4 SX

COORDINATES:
Geographic:
61°19` 32.50" N – 03° 57` 55.23" E

UTM:
6 799 609.4m N – 551 677.2m E
ED50, Zone 31 (CM 3° E).

RIG: Transocean Leader
RKB: 23.5m
SPUD DATE: 12.07.98
COMPLETION DATE: 12.08.98

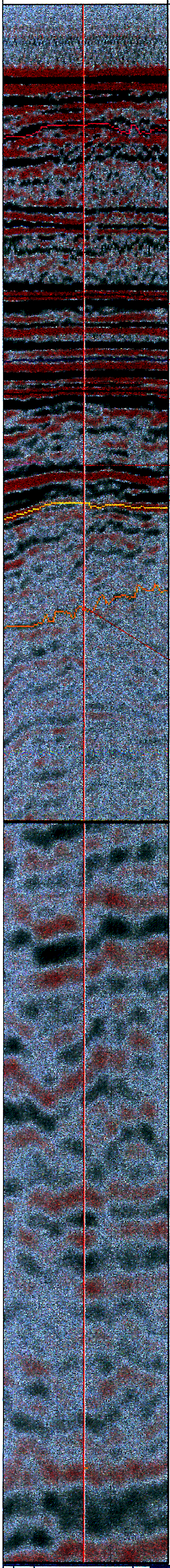
LEGEND:
- Clay/claystone
- Silt/Siltstone
- Sand/sandstone
- Limestone
- Boulders
- Cement plug

Seismic	Prognosis					Correlation
Time 0 to 950ms: High resolution line NH9060-325 (acquired Oct. 1990, 12.5m cdp spacing, 2.5 sec. record length & 1ms sample rate, processed to min.phase). Below 950ms: 3D exploration seismic, crossline 1111. Well located 60m west of HR line	Reflectors	TWT (ms)	Int. vel	Depth (m RKB)	Anomaly	

Reflectors	TWT (ms)	Int. vel	Depth (m RKB)
Seabed	489		389.5
	505	1667	400.5
mu_PleiR1-1	525		420.5
	590	1867	484.5
mu_PleiR3	603		497.5
mu_PleiR4	641		535.5
mu_PleiR5	675	2286	569.5
mu_PleiR6	696		593.5
		1938	
mu_EocR7-1	758		655
		2133	
mu_PalR8	848		751
		2427	

*Caution advised

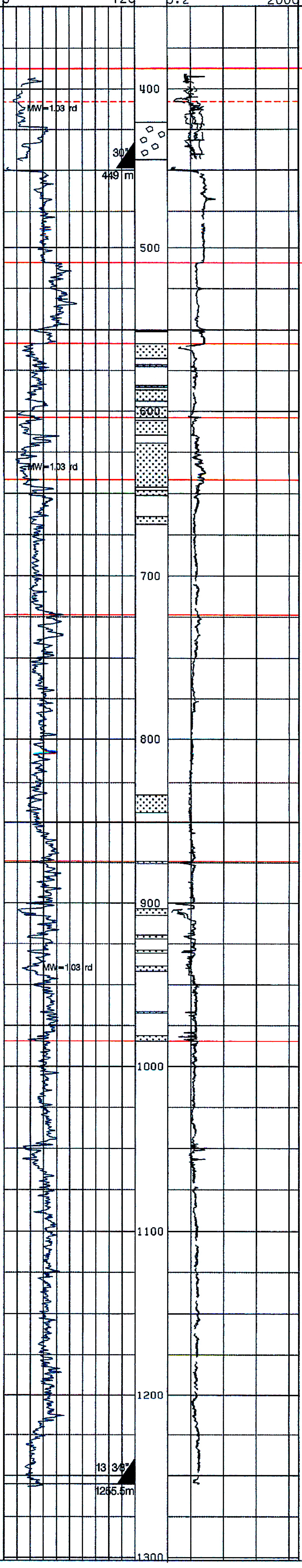
3D exploration seismic



Stratigraphy: System | Series | Group | Formation | Informal Unit

QUATERNARY – Holo. – Pleistocene – Nordland – Naust Shf
TERTIARY – Eocene – Hordaland; Balder; Sele; Paleocene – Rogaland – Lista

Gamma: GR 0–120
TVD
Resistivity: RACM 0.2–2000; RPCM 0.2–2000
Shallow Gas: None



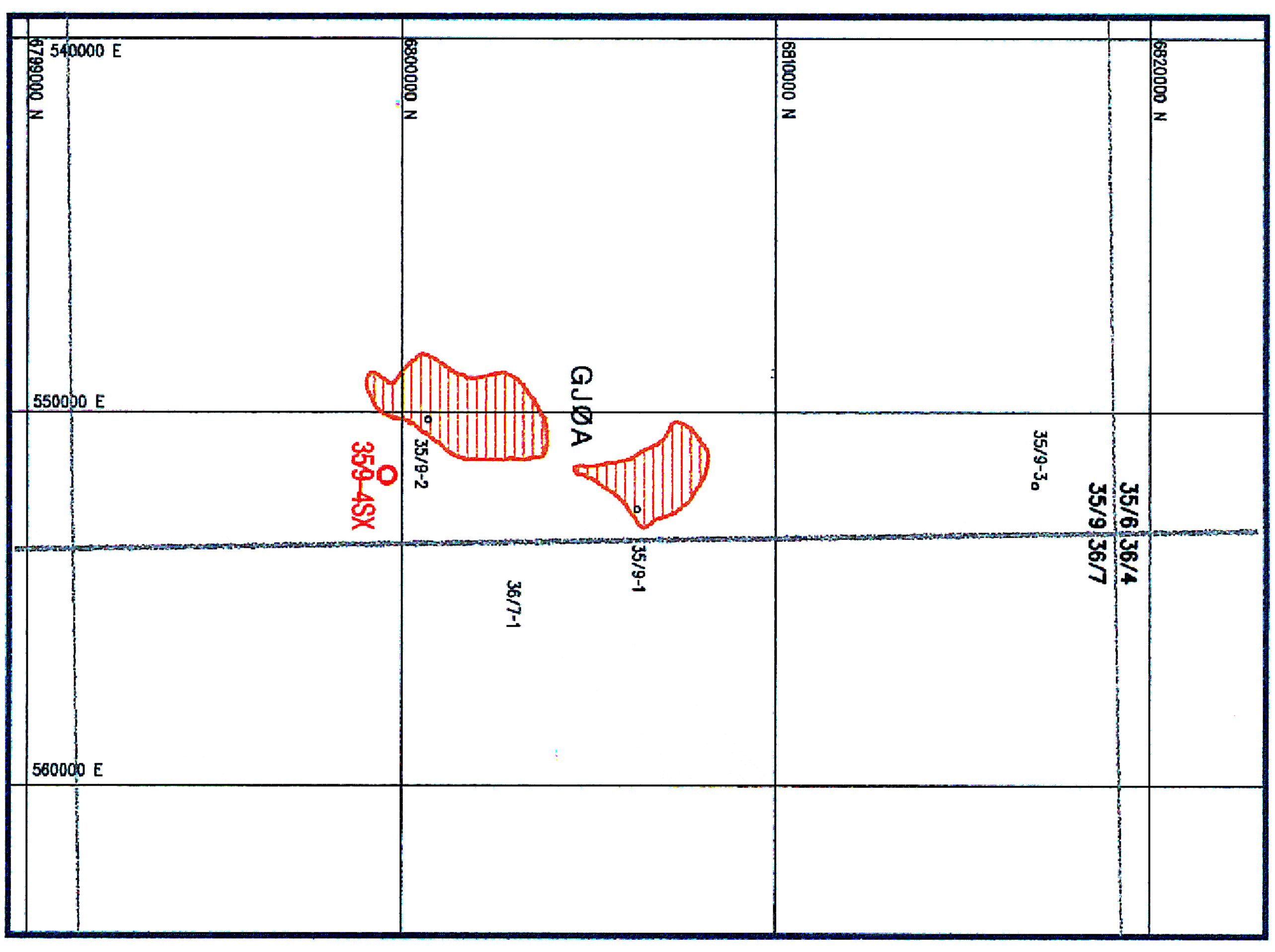
Results

Drilled with returns to seabed to 1261m RKB. TWT from seismic.
Depths in metres below RKB

Results	Int.vel.
387.5 m (489 ms)	
409 m (516 ms)	
Possible boulders (420.5 m to 443.5 m)	1736
509 m (629 ms)	
550–551 m; 559 m (684 ms)	1818
559–567 m	
Shallow Water Flow (c. 559 m & 600 m)	1840
585–594 m; 605 m (734 ms)	
597–614 m	
619–651 m; 642 m (c. 770 ms)	
664–669 m	2070
723 m (848 ms)	
832–843 m	approx. 2427
874–876 m	
Source ?	
903–907 m	
919–922 m; 929–931 m; 938–941 m — Shallow Water Flow (875 m & 985 m)	
966–967 m	
981–985 m	
TD 1261 m, Well plugged and abandoned	

NOTES:
The stratigraphy shown above is the same as that used in the site survey report and is based on correlation with the 35/9-2 bewell. No biostratigraphic information was collected during the drilling of the well.

ED50, UTM Zone 31 (CM 3°E)



HYDRO
Exploration and Production Division
Marine Surveys Section

Drawing title:
Post site survey for well 35/9-4SX
Comparison between predicted lithology, stratigraphy, shallow gas and obtained drilling results

Scale 1:2000

Interpreted by	Drawn by	Checked by	Date	File no.	Rev.
FSS	MRD	KB	27.01.1999	j/gis/35-9/sgn/ei2/sb.dgn	0

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